ALASKA RESPONSIBLE FISHERY MANAGEMENT CERTIFICATION SURVEILLANCE REPORT (NO.4)

For The

Alaska Sablefish Commercial fishery

Client

Eat on the Wild Side (FVOA)

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I. Summary and Recommendations

The Alaska Seafood Marketing Institute, requested assessment of the Alaska sablefish (black-cod) commercial fisheries to the FAO Based Responsible Fisheries Management (RFM) Certification Program. The application was made in April 2010. Assessment commenced in April 2010 with assessment validation before proceeding to full assessment and final certification determination in October 2011. In May 2015, the Fishing Vessels Owners Association became the new client holding the certificate for this fishery.

This report is the 4th Surveillance Report (ref: AK/SAB/001.4/2015) for the Alaska sablefish federal and state commercial fisheries following certification award against this FAO-Based RFM Program, awarded on October 11th 2011. The objective of the Surveillance Report is to monitor for any changes/updates (after 12 months) in the management regime, regulations and their implementation since the previous assessment; in this case the third surveillance report completed in September 2014. The report determines whether these changes and current practices remain consistent with the overall scorings of the fishery allocated during initial certification.

In addition to this, corrective action plans resulting from non-conformances in the previous assessments are reassessed and a new conclusion on consistency of these items with the Conformance Criteria is given accordingly. Also, any areas reported as “items for surveillance”, although not defined as formal non conformances, are explored as areas which could potentially cause a change (lower or higher) in the score of a given clause.

The certification covers the Alaskan sablefish *(Anoplopoma fimbria)* commercial fishery employing demersal longline, pot and trawl gear within Alaska jurisdiction (200 nautical miles EEZ) under federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management.

The surveillance assessment was conducted according to the Global Trust Certification ISO 65 accredited procedures for FAO – Based Responsible Fisheries Management Certification using the Alaska FAO – Based RFM Conformance Criteria Version 1.2 fundamental clauses as the assessment framework.

The assessment was conducted by a team of Global Trust appointed assessors. Details of the assessment team are provided in Appendix 1.

The main Key outcomes have been summarized in Section 5 “Assessment Outcome Summary”.

II. Assessment Team Details

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I. Acronyms

ABC	Allowable Biological Catch
ACL	Annual Catch Limits
ADFG	Alaska Department of Fish and Game
AFA	American Fisheries Act
AFSC	Alaska Fisheries Science Center
ANILCA	Alaska National Interest Lands Conservation Act
ASMI	Alaska Seafood Marketing Institute
AWT	Alaska Wildlife Troopers
BOEM	Bureau of Ocean Energy Management, Regulation and Enforcement
BOF	Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CCRF	Code of Conduct for Responsible Fisheries
CDQ	Community Development Quota
CFEC	Commercial Fisheries Entry Commission
CP	Catcher Processor (vessel)
CPUE	Catch per Unit Effort
CV	Catcher Vessel
DEC	Department of Environmental Conservation
DFO	Department of Fisheries and Oceans (Canada)
DNR	Department of Natural Resources
EBio	Exploitable (stock) biomass
EBS	Eastern Bering Sea
EIS	Environmental Impact Statement
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FAO	Food and Agriculture Organization of the United Nations
FMP	Fishery Management Plan
GOA	Gulf of Alaska
HCR	Harvest Control Rules
IFQ	Individual Fishing Quota
IPHC	International Pacific Halibut Commission
LLP	License Limitation Program
MSA	Magnuson-Stevens Act
MSST	Minimum Standing Stock Threshold
Mt	Metric tons
MSY	Maximum Sustainable Yield
NEPA	National Environmental Policy Act
Nm	Nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
OFL	Overfishing Limit or Level
OLE	Office for Law Enforcement

OPMP	Office of Project Management and Permitting
PSC	Prohibited Species Catch
RACE	Resource Assessment and Conservation Engineering
REFM	Resource Ecology and Fisheries Management
RFM	Responsible Fisheries Management
SAFE	Stock Assessment and Fishery Evaluation (Report)
SSB	Spawning (stock) biomass
SHARC	Subsistence Halibut Registration Certificate
SPR	Spawning Potential Ratio
SSC	Scientific and Statistical Committee
TAC	Total Allowable Catch
TCEY	Target Constant Exploitation Rate
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service

1. Introduction

Unit of Certification

The sablefish/black-cod (*Anoplopoma fimbria*) commercial (federal and state) fisheries, employing demersal longline (mainly), pot and trawl gear within Alaska jurisdiction (200 nautical miles EEZ) under federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management, underwent their 4th surveillance assessment against the requirements of the Alaska FAO-Based RFM Conformance Criteria Version 1.2 Fundamental clauses.

This 4th Surveillance Report documents the assessment result for the continued certification of commercially exploited Alaska sablefish fishery to the Alaska FAO-Based RFM Certification Program. This is a voluntary program owned by ASMI who wish to provide an independent, third-party certification that can be used to verify that these fisheries are responsibly managed according to the Alaska FAO-Based RFM Program.

The assessment was conducted according to the Global Trust procedures for Alaska FAO-Based RFM Certification using the fundamental clauses of the Alaska FAO-Based RFM Conformance Criteria Version 1.2 (Sept 2011) in accordance with EN45011/ISO/IEC Guide 65 accredited certification procedures. The assessment is based on the Fundamental clauses specified in the Conformance Criteria.

The assessment is based on 6 major components of responsible management derived from the FAO Code of conduct for Responsible Fisheries (1995) and Guidelines for the Eco-labeling of products from marine capture fisheries (2009).

A The Fisheries Management System
B Science and Stock Assessment Activities
C The Precautionary Approach
D Management Measures
E Implementation, Monitoring and Control
F Serious Impacts of the Fishery on the Ecosystem

These six major components are supported by 13 fundamental clauses (+ 1 in case of enhanced fisheries) against which a capture fishery certified under the Program is assessed during a surveillance assessment.

A summary of the site meetings is presented in Section 5. Assessors comprised of both externally contracted fishery experts and Global Trust internal staff (Appendix 1).

This report documents the 4th Surveillance Assessment (2015) of the Alaska sablefish commercial federal and state fisheries, originally certified on October 11th 2011, and the recommendation of the Assessment Team for continued FAO-Based RFM Certification.

1.1. Recommendation of the Assessment Team

Following this 4th Surveillance Report in 2014 the assessment team recommends that continued Certification under the Alaska FAO-Based Responsible Fisheries Management Certification Program is maintained for the management system of the applicant fishery, the sablefish (black cod) commercial federal and state fisheries, employing demersal longline, pot and trawl gear within Alaska jurisdiction (200 nautical miles EEZ) under federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management.

2. Fishery Applicant Details

Key Management Contact Information			
Full Name:	*(Last)* **Alverson**	*(First)* **Robert**	
Position:			
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Nominated Deputy:	***As Above***		
Deputy Phone:	**As Above**	**Deputy E-mail Address:**	

3. Unit of Certification

Unit of Certification			
U.S. ALASKA SABLEFISH (Black Cod) COMMERCIAL FISHERIES			
Fish Species (Common & Scientific Name)	**Geographical Location of Fishery**	**Gear Type**	**Principal Management Authority**
Sablefish (black-cod) *(Anoplopoma fimbria)*	Federal and state fisheries in the Gulf of Alaska and Bering Sea & Aleutian Islands.	Benthic longline, Pot, Bottom Trawl.	National Marine Fisheries Service (NMFS); North Pacific Fishery Management Council (NPFMC); Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF).

4. Surveillance Meetings

Organization	Time, day and location	Main items discussed
Client Mr Robert Alverson	Monday 27th of July 2015, 1:00 PM Fishermen terminal Seattle, Washington, USA.	• Current challenges in management or conservation based science • How well does the fishery management system respond to resolving issues in the industry?
NPFMC (North Pacific Fisheries Management Council) Anchorage	Tuesday 28th July 2015 Time 9.00am	• Key changes to management measures • Impact of recent measures to reduce halibut by-catch in some sablefish fisheries • 2014 Observer Annual Report
Alaska Division Fish and Game (ADFG)	Wednesday 29th of July 2015, 9:00 AM ADFG Headquarters, Juneau, AK	• Tagging program • 2014 Sablefish survey • Low recruitment issues • Management Issues
Alaska State Troopers	Wednesday 29th of July 2015, 1:00 PM AWT Headquarters, Juneau	• Boardings and violations
NOAA NMFS Alaska Fisheries Science Center, Ted Stevens Research Institute (NOAA AKFSC)	Wednesday 29th of July 2015, 3:00 PM NOAA AKFSC Ted Stevens Research Institute, Juneau, AK	• Key changes to surveys, data collection • Stock assessment improvements • Seabird data
NOAA Alaska NMFS Regional Office	Thursday 30th of July 2015, 9:30 AM NOAA Alaska NMFS Regional Office Juneau, AK	• Bycatch data • Observer program • Fleet allocations, apportionments

Stakeholder Submissions: The Alaska Seafood Marketing Institute website provides an opportunity for stakeholders to provide information that is relevant for the full assessment or surveillance audit of fisheries within the Alaska FAO Based Responsible Fisheries Management Certification Program.

All scientific, objective information relative to the assessment provided to the assessment team is used as part of the assessment and referenced for transparency at the end of the report.

5. Assessment Outcome Summary

Fundamental Clauses Summaries

Clause 1: Structured and legally mandated management system

Evidence adequacy rating: High

No significant change has occurred in the management of sablefish in Alaska since 2014. The U.S. Alaska sablefish commercial fishery is managed by the North Pacific Fishery Management Council (NPFMC) and the NOAA's National Marine Fisheries Service (NMFS) in the federal waters (3-200 nm); and by the Alaska Department for Fish and Game (ADFG) and the Board of Fisheries (BOF) in the state waters (0-3 nm). In federal waters, the Alaska sablefish fishery is managed through the NPFMC's GOA and BSAI Groundfish Fishery Management Plans (FMPs) written and amended subject to the Magnuson Stevens Act (MSA). The FMPs established an Individual Fishing Quota (IFQ) management program for this fishery. State sablefish fisheries are managed outside the IFQ program using a Guideline Harvest Level (GHL). The US Coast Guard and the Alaska Wildlife Troopers enforce fisheries regulations in federal and state waters respectively.

Clause 2: Coastal area management frameworks

Evidence adequacy rating: High

No significant change has occurred since the previous surveillance assessment in 2014.

The NMFS and the NPFMC participate in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes. These include decision-making processes and activities relevant to fishery resources and users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users. The NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. With regards to conflict avoidance and resolution between different fisheries, the North Pacific Fishery Management Council (NPFMC) and the Board of Fisheries (BOF) tend to avoid conflict by actively involving stakeholders in the process leading up to decision making. Both entities provide a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The Council and the BOF actively encourages stakeholder participation, and all their deliberations are conducted in open, public sessions. Effectively, these meetings provide forums for avoidance of potential fisheries conflicts.

Clause 3: Management objectives and plan

Evidence adequacy rating: High

No significant changes have occurred since the previous surveillance audit in 2014. The Magnuson Stevens Fishery Conservation and Management Act (Magnuson Stevens Act, MSA) is the primary domestic legislation governing management of the nation's marine fisheries. Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, a Fishery Management Plan (FMP) and any necessary amendments, for each fishery under its authority that requires conservation and management. These include Groundfish FMPs for the Gulf of Alaska and the Bering Sea & Aleutian Islands, which incorporate the sablefish

fisheries in those regions. Both FMPs present long-term management objectives for the Alaska sablefish fishery. In state waters (0-3 nm), five Alaska sablefish fisheries are managed by ADFG and the BOF outside the IFQ program using a Guideline Harvest Level (GHL). The Aleutian Islands District and Western District of the South Alaska Peninsula Area Sablefish Management Plan (5 AAC 28.640) governs the harvest of sablefish in the Area as described in 5 AAC 28.555(b). 5 AAC 28.360 defines the Cook Inlet Sablefish Management Plan. Sablefish harvest, possession, and landing requirements for Prince William Sound Area are governed under 5 AAC 28.272. Southeast Alaska State managed sablefish (Chatham and Clarence strait) regulations are specified under 5 AAC 28.160 in the Groundfish Commercial Fisheries Regulations. These regulations document long term management objectives for these fisheries.

Clause 4: Fishery data

Evidence adequacy rating: High

The NMFS and ADFG collect fishery data and conduct fishery independent surveys (longline and trawl) to assess the sablefish populations and ecosystems in GOA and BSAI areas. GOA and BSAI SAFE documents provide complete descriptions of data types and time series of collections. The NMFS/AFSC conducts annual sablefish longline surveys on the continental slope of the eastern Bering Sea, Aleutian Islands, and the GOA. In state waters, fishery independent data come from longline and trawl surveys as well as mark-recapture studies in the NSEI. Fishery dependent data are collected from fixed gear (longline and pot) vessels which target sablefish in the federal IFQ fishery and trawl fisheries that catch sablefish as retained bycatch in other fisheries such as rockfish and sole. Records of catch and effort for these vessels are recorded through the e-landing (electronic fish tickets) catch recording system and also collected by observers and by vessel captains in voluntary and required logbooks. A new Observer Program designed to expand coverage to vessels less than 60 feet long and to provide more flexibility to meet management needs was implemented in 2013 and continued in 2014. The data available for this stock have been updated annually where possible, and provide sufficient information for indices used in the stock assessment models. Ecosystem considerations for the sablefish stock and fisheries are reported in the sablefish SAFE report, and economic analyses are also carried out.

Clause 5: Stock assessment

Evidence adequacy rating: High

The mission of the NMFS/AFSC is to plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence. The sablefish population is assessed with a statistical, forward-projecting age-structured model which estimates population numbers and mortality rates separately for male and female sablefish. The results of the assessment are fully documented in the 2014 SAFE. Apart from new data, there are no model changes in 2014 relative to 2013. ADFG annual longline research surveys began in 1988 in both Northern southeast inside (NSEI) and Southern southeast inside (SSEI) subdistricts to assess the relative abundance of sablefish over time and differing environmental conditions. Mark-recapture studies for sablefish are also carried out in NSEI. The Cook Inlet fishery is managed using a Guideline Harvest Level (GHL) based on harvest history, fishery performance, and the federal survey for the

area. The Aleutian Island fishery is set as 5% of the BSAI federal TAC. The Prince William Sound sablefish fishery is managed using a GHL derived from the estimated area of sablefish habitat and a yield-per-unit-area model.

Clause 6: Biological reference points and harvest control rule

Evidence adequacy rating: High

No significant changes have occurred since the previous surveillance audit in 2014. The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The Tier system specifies the maximum permissible Allowable Biological Catch (ABC) and of the Overfishing Limit (OFL) for each stock in the complex (usually individual species but sometimes species groups). The sablefish stock in Alaska is managed under Tier 3. For these stocks, the spawner-recruit relationship is uncertain, so that MSY cannot be estimated with higher confidence levels. Hence, a surrogate based on F40% is used, following findings in the scientific literature in the 1990s. For Tier 3 stocks, the MSY proxy level is defined as B35%. The MSST limit reference point is ½ MSY or B17.5%. The probability that next year's spawning biomass was below B35% was 0.89. During the next three years, the probability of falling below B17.5% is near zero, the probability of falling below B35% is 0.97, and the probability of staying below B40% is near 100%. In NPFMC settings, thresholds are defined in the Council harvest rules. These are when the spawning biomass falls below MSY or B35% and when the spawning biomass falls below ½ MSY=MSST or B17.5% which calls for a rebuilding plan under the MSA. The harvest control rule applied to sablefish is recognized as being effective at maintaining the stock at a biomass capable of producing maximum sustainable yield. When stock size falls below a target, the harvest rate is reduced to promote rebuilding to the target. The current biomass of sablefish is estimated to be below the B40% target, and consequently the TAC for the next year will be determined by the rule in Tier 3b, e.g. the harvest rate will be below the maximum allowed. Based on the 2014 SAFE, and the National Standard Guideline definitions, the stock is not subject to overfishing, overfished, or approaching an overfished condition. One of the five state-managed stocks (NSEI) uses an F-based reference point in setting catch levels, and 3 of the 4 others use GHLs tied to the ABCs set in federal waters.

Clause 7: Precautionary approach

Evidence adequacy rating: High

No significant changes have occurred since the previous surveillance audit in 2014. The first element of the precautionary approach is the Optimum Yield (OY) for the groundfish complexes in the Bering Sea / Aleutian Islands (BSAI) and the GOA as a range of numbers. The sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within the range. The second element of precautionary approach is the Tier system, based on knowledge and uncertainties of the stock in question. NPFMC inaugurated the Tier system in fisheries management: the harvest control rule depends on the amount of information available. The less the information about a given stock, the more conservative is the catch allowed. The third element of the precautionary approach is the ACL, OFL, ABC and TAC system. Allowable Biological Catch (ABC) is a scientifically acceptable level of harvest based on the biological characteristics of the stock and its current biomass level. Overfishing Limit (OFL) is a limiting catch level, corresponding to fishing at MSY level, higher than ABC, which demarcates the boundary beyond which the fishery is no longer viewed as sustainable. In application, the NPFMC sets TAC ≤ ABC < OFL. Bycatch from a given stock is limited by a Maximum Retainable Amount (MRA), which is determined as a percentage of retained catch. Alternatively, Prohibited Species Catches (PSC) limits close fisheries when reached.

Clause 8: Management measures

Evidence adequacy rating: High

The federal sablefish fishery is managed under an Individual Fishing Quota system (IFQ). Under the major State-managed sablefish fisheries, the use of an equal quota share system is very much like individual fishery quotas, and produces the same efficiencies. The 2006 reauthorization of the MSA included the requirement that the NPFMC specify Annual Catch Limits (ACLs) with accompanying accountability measures when setting annual harvest quotas. The guidelines stipulated that ACL may not exceed ABC and that if ACL=ABC=OFL, then the proposal will prevent overfishing with accountability measures. Because Council's groundfish FMPs are multiyear plans, their plans provide that if ACL is exceeded in one year, then accountability measures are triggered for the next year to assure compliance and to subsequently account for whatever catches, bycatch or discards previously unaccounted. The Federal FMP for the BSAI and GOA list numerous fishery closures that are in place throughout Alaska, and there are also a number of closed areas in state-managed waters. These closures apply to a range of vessels, seasons, and gear types. The NMFS and the ADFG have well-established regulations on fishing seasons and legal gear use. Longline, trawl and pot gear are all regulated to increase selectivity of the target species and to avoid bycatch, discards, and ghost fishing. In addition to this, management measures and operational methods (i.e. MRA, PSC) are in place to regulate and account for bycatch and discards of encountered bycatch species. Recent improvements have been implemented in the observer program, and efforts are underway to introduce electronic at-sea monitoring on some fleets.

Clause 9: Management measures to produce maximum sustainable levels

Evidence adequacy rating: High

No significant change has occurred since the previous surveillance assessment in 2014. The MSA governs management of the Alaskan federally managed fisheries. The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The rigorous process in place for over 30 years ensures that annual quotas are set at conservative, sustainable levels for all managed groundfish stocks. Model projections indicate that the sablefish stock in Alaska is neither overfished nor approaching an overfished condition. For Tier 3 stocks, the MSY proxy level is defined as B35%. Projected female spawning biomass (combined areas) for 2015 is 91,183 t (88% of B40%), placing sablefish in sub-tier "b" of Tier 3. The MSY, defined in the BSAI and GOA groundfish FMPs, is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions, fishery technological characteristics (e.g., gear selectivity), and distribution of catch among fleets. The MSY allows defining the reference points used to manage the groundfish fisheries such that TAC ≤ ABC < OFL. The harvest control rule is designed to ensure the population is capable of producing MSY. Some state managed fisheries are based on the federal data and reference points, while others use stat-collected survey data to determine harvest levels. State catches of sablefish are often below the specified GHLs.

Clause 10: Appropriate standards of fisher's competence

Evidence adequacy rating: High

Any aspirant sablefish fisherman must have 150 days of sablefish fishing experience before being able to purchase sablefish IFQs. Obtaining sablefish IFQ share most often will require the purchaser to enter into loan capital arrangements with banks that will require comprehensive fishing business plans supported by competent, professional fishermen with demonstrable fishing experience. Several training opportunities are available to train crew members in Alaska.

Clause 11: Effective legal and administrative framework

Evidence adequacy rating: High

The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce Alaska federal fisheries laws and regulations, especially 50CFR679. The federal violations in this fishery are reported to and investigated by NOAA's Office of Law Enforcement's Alaska Division and prosecuted by NOAA's Office of General Counsel's Enforcement Section. OLE Special Agents and Enforcement Officers conduct complex criminal and civil investigations, board vessels fishing at sea, inspect fish processing plants, review sales of wildlife products on the internet and conduct patrols on land, in the air and at sea. NOAA Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements (SS) or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation (GCEL). The Alaska Wildlife Troopers (AWT) enforce state regulations.

Clause 12: Framework for sanctions

Evidence adequacy rating: High

The Magnuson-Stevens Act (50CFR600.740 Enforcement policy) provides four basic enforcement remedies for violations: ***1)*** *Issuance of a citation (a type of warning), usually at the scene of the offense,* ***2)*** *Assessment by the Administrator of a civil money penalty,* ***3)*** *for certain violations, judicial forfeiture action against the vessel and its catch,* ***4)*** *Criminal prosecution of the owner or operator for some offenses. In some cases, the Magnuson-Stevens Act requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. The 2011 Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions issued by NOAA Office of the General Counsel – Enforcement and Litigation, provides guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. The Alaska Wildlife troopers enforce state water regulations with a number of statutes that enable the government to fine, imprison, and confiscate equipment for violations and restrict an individual's right to fish if convicted of a violation*.

Clause 13: Impacts of the fishery on the ecosystem

Evidence adequacy rating: High

The NPFMC and NOAA/NMFS conduct assessments and research related to fishery impacts ecosystems and habitats and how environmental factors affect the fishery. Findings and conclusions are published in the Ecosystem section of the SAFE document, annual Ecosystem Considerations documents, and the various other research reports. The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS, 2005) concluded that the benthic longline and pot fisheries have minimal or temporary impacts on sablefish habitat. Various studies have applied ecosystem models to food webs and impacts of climate change. Sablefish have low discard rates in other fisheries. The directed sablefish fishery takes significant amounts of grenadiers, arrowtooth flounder, spiny dogfish, sharks and some rockfish; but the fishery does not pose a threat to bycatch species. Management measures limit interactions with seabirds and the fishery has minimal impact on the short-tailed albatross, the only seabird listed as endangered under the ESA. Interactions with whales remain a problem as they take fish off longline gear, but the fishery does not adversely affect whale populations.

6. Conformity Statement

The Assessment Team recommends that continued certification under the Alaska FAO Based Responsible Fisheries Program is granted to the Alaska sablefish (*Anoplopoma fimbria*) federal and state commercial fisheries employing demersal longline (mainly), pot and trawl gear within Alaska jurisdiction (200 nautical miles EEZ) under federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] management.

7. FAO-Based Conformance Criteria Fundamental Clauses for Surveillance Reporting

A. The Fisheries Management System

1. There shall be a structured and legally mandated management system based upon and respecting International, National and local fishery laws, for the responsible utilization of the stock under consideration and conservation of the marine environment.

FAO CCRF 7.1.3/7.1.4/7.1.9/7.3.1/7.3.2/7.3.4/7.6.8/7.7.1/10.3.1

FAO Eco 28

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Rating determination

No significant change has occurred in the management of sablefish in Alaska since 2014. The U.S. Alaska sablefish commercial fishery is managed by the North Pacific Fishery Management Council (NPFMC) and the NOAA's National Marine Fisheries Service (NMFS) in the federal waters (3-200 nm); and by the Alaska Department for Fish and Game (ADFG) and the Board of Fisheries (BOF) in the state waters (0-3 nm). In federal waters, the Alaska sablefish fishery is managed through the NPFMC's GOA and BSAI Groundfish Fishery Management Plans (FMPs) written and amended subject to the Magnuson Stevens Act (MSA). The FMPs established an Individual Fishing Quota (IFQ) management program for this fishery. State sablefish fisheries are managed outside the IFQ program using a Guideline Harvest Level (GHL). The US Coast Guard and the Alaska Wildlife Troopers enforce fisheries regulations in federal and state waters respectively.

The NPFMC recommends regulations to govern the directed sablefish fisheries and makes allocation decisions among sablefish users and user groups in federal waters off Alaska. NPFMC sablefish management measures include a Total Allowable Catch (TAC), which is divided among gear types [trawl and fixed (longline and pot) gear] and an Individual Fishing Quota (IFQ) program is used for the majority of the TAC taken by the fixed gear fleet. Fixed gear (mainly longlines, but also pots) harvests around 90% of the sablefish quota and trawl gear about 10%. In fact, in 2014 fixed gear harvested 12,604 tons of sablefish while trawl gear harvested 1,038 tons.

The NMFS conducts stock surveys, stock assessment reports and a multitude of biological and environmental studies, and in connection with the United States Coast Guard (USCG) enforces fisheries regulations. NOAA's Alaska Fisheries Science Center (AFSC) annually assesses the abundance of sablefish through longline surveys. The groundfish trawl survey is also used to gauge sablefish abundance. Fishery dependent data also collected by on-board fishery observers and through required and voluntary logbook programs. The NMFS has been tagging and releasing sablefish in Alaska waters since 1972 to study movements, evaluate apportionment for quota, validate aging methods and examine growth. In 1995, NPFMC and the NMFS implemented an IFQ system for the Alaska sablefish and halibut fisheries. These agencies, and all of their activities and

decisions, are subject to the Magnuson Stevens Act (MSA) which is the primary domestic legislation governing management of the United States marine fisheries and requires the creation of FMPs.[1]

In state waters (0-3 nm), five sablefish state fisheries are managed by the ADFG and the BOF outside the IFQ program. Two minor state fisheries are in Cook Inlet and the Aleutian Islands managed using a Guideline Harvest Level (GHL), which is determined based on harvest history, fishery performance, and the federal survey for the area. Three major state fisheries exist which are limited entry and are located in Prince William Sound, Chatham and Clarence Strait. The Prince William Sound sablefish fishery is managed using a GHL and derived from the estimated area of sablefish habitat and a yield-per-unit-area model. For the Clarence and Chatham Strait fisheries an annual harvest objective is set with regard to survey and fishery catch per unit effort and biological characteristics of the population. In addition, in Chatham Strait an annual stock assessment is performed which includes a mark-recapture estimate of the population abundance.

Sablefish are caught primarily with longline gear in Alaska; however, the Clarence Strait area has both a season for pot and longline gear. The Aleutian Islands state fishery allows longline, pot, jig, and hand troll gear, and one trawl vessel qualifies for the limited entry program in Prince William Sound. In federal waters, sablefish are primarily caught in directed fisheries on longline gear; however, an increasing trend toward pot gear exists due to whale depredation of sablefish on longline gear. Pots are longlined with approximately 40-135 pots per set. In addition, sablefish are caught as bycatch in trawl fisheries. Trawl fisheries are assigned sablefish quota since they intercept sablefish in the course of targeting other fisheries (e.g. pacific cod, flatfish, etc.). The Alaska Wildlife Troopers (AWT) enforce fisheries regulations in state waters.[2]

The NPFMC and NMFS produce annual Stock Assessment & Fishery Evaluation (SAFE) reports for each fishery under federal jurisdiction, including Alaska sablefish. Both state and federal assessment biologists meet at the NPFMC Plan Team meetings and share assessment information and harvest strategies to assure conservation management over the entire stock distribution. The NPFMC provides a great deal of information on their website, including meeting agendas, discussion papers, and records of decisions. The Council actively encourages stakeholder participation, and all Council deliberations are conducted in open, public session. Similarly, ADFG conducts stock assessments in State waters to determine safe harvest levels. The BOF process is transparent, and open to all stakeholders. Anyone may submit regulatory proposals, and all such proposals are given due consideration by the BOF.[3]

[1] North Pacific Fisheries Management Council http://www.npfmc.org/

[2] Alaska Department of Fish and Game. Sablefish Management. Accessed 2015 http://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management

[3] SAFE report 2014. Assessment of the sablefish stock in Alaska by Dana H. Hanselman, Chris R. Lunsford, and Cara J. Rodgveller Accessed 2015 http://www.afsc.noaa.gov/REFM/Docs/2014/BSAIsablefish.pdf

New for 2015

GOA Sablefish IFQ Pots

The Council took action to allow the use of longline pot gear in the GOA sablefish IFQ fishery. The preferred alternative gives vessel operators the choice to use either pot longline gear or hook-and-line longline (HAL) gear. Public testimony and the Council's analysis indicated that pot gear could help fishermen reduce the negative effects of whale depredation. Reduced depredation could also mitigate a source of unaccounted sablefish mortality, thus enhancing the precision of stock abundance estimates. The Council selected elements of its preferred alternative that are intended to limit the likelihood and severity of gear conflicts and grounds preemption that might result from the introduction of a second gear type. IFQ holders who use longline pots are formally encouraged to develop protocols for providing information that helps all fishermen share the fishing grounds. NMFS will report on pot gear effort in its management reports to the Council, and the Council will conduct a review of the fishery three years after rule implementation to identify any need for further management action. In order to limit the amount of space that pots occupy on the fishing grounds, each vessel is limited in the number of pots that it can deploy in each GOA management area. No more than 120 pots can be used in the West Yakutat or the Southeast Outside districts of the Eastern Gulf. No more than 300 pots can be used in the Central or the Western Gulf. NMFS will establish a system of pot tags to enforce this limitation. Vessels fishing longline pot gear, regardless of their size, must also fill out a NMFS logbook to aid in enforcement. The Council also limited the amount of time that pot gear can be left on the grounds without being moved or tended. Gear cannot be left for more than five days in CGOA and WY, and not for more than seven days in WGOA. Vessels in SE must remove their pots from the grounds when making a sablefish delivery. The different limits reflect the four GOA areas' varied fleet size, fishing area concentration, and run-times to port. To aid in enforcement, vessels using longline pot gear will be required to use VMS, and to declare the status of their pots when making a Prior Notice of Landing. The Council recommended that legal-size halibut caught incidentally in GOA sablefish pots should be retained (by those holding halibut IFQ). Implementation of the halibut retention requirement is contingent upon rulemaking by IPHC, which would not occur until early 2016. If IPHC does not make longline pots a legal gear for halibut, any halibut caught in this fishery with pot gear would have to be discarded. [4]

[4] News & Notes North Pacific Fisheries Management Council April 2015. Accessed 2015. http://www.npfmc.org/wp-content/PDFdocuments/newsletters/news415.pdf

2. Management organizations shall participate in coastal area management institutional frameworks, decision-making processes and activities related to the fishery and its users, in support of sustainable and integrated resource use, and conflict avoidance.

FAO CCRF 10.1.1/10.1.2/10.1.4/10.2.1/10.2.2/10.2.4

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating Determination

No significant change has occurred since the previous surveillance assessment in 2014.The NMFS and the NPFMC participate in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes. These include decision-making processes and activities relevant to fishery resources and users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users. The NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. With regards to conflict avoidance and resolution between different fisheries, the North Pacific Fishery Management Council (NPFMC) and the Board of Fisheries (BOF) tend to avoid conflict by actively involving stakeholders in the process leading up to decision making. Both entities provide a great deal of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The Council and the BOF actively encourages stakeholder participation, and all their deliberations are conducted in open, public sessions. Effectively, these meetings provide forums for avoidance of potential fisheries conflicts.

NEPA

The NMFS and the NPFMC participate in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) processes. These include decision-making processes and activities relevant to fishery resources and users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users. The state of Alaska is a cooperating agency in the NEPA process for federal actions, giving it a seat at the table for federal actions. The NEPA process is essentially a biological/environmental, and socio-economic impact assessment where proposed options for significant developments and/or changes in current management practices are evaluated, before a final decision is taken. One of the latest NEPA analyses has seen the restructuring of the observer program to cover the previously unobserved vessels less than 60 feet LOA participating in sablefish and halibut harvest.[5]

The NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. Fisheries are relevant to the NEPA process in two ways. First, each NPFMC fisheries package must go through the NEPA review process. Second, any project that could impact fisheries (i.e., oil and gas, mining, coastal construction projects, etc.,) that is either on federal lands, in federal waters, receives federal funds or requires a federal permit,

[5] United States Environmental Protection agency. Accessed 2015 http://www2.epa.gov/nepa/what-national-environmental-policy-act

must go through the NEPA process. In this manner, both fisheries and non-fisheries projects that have a potential to impact fisheries have a built in process by which concerns of the NPFMC, NMFS, state agencies, industry, other stakeholders or the public must be accounted for.

DEC

The Alaska Department of Environmental Conservation (DEC) implements statutes and regulations affecting air, land and water quality. DEC is the lead state agency for implementing the federal Clean Water Act and its authorities provide considerable opportunity to maintain high quality fish and wildlife habitat through pollution prevention.[6]

ADFG

ADFG protects estuarine and marine habitats primarily through cooperative efforts involving other state and federal agencies and local governments. ADFG has jurisdiction over the mouths of designated anadromous fish streams and legislatively designated state special areas (critical habitat areas, sanctuaries and refuges). Some marine species also receive special consideration through the state Endangered Species program. [7]

DNR

The Alaska Department of Natural Resources (DNR) manages all state-owned land, water and natural resources except for fish and game. This includes most of the state's tidelands out to the three mile limit and approximately 34,000 miles of coastline. DNR authorizes the use of log-transfer sites, access across state land and water, set-net sites for commercial gill net fishing, mariculture sites for shellfish farming, lodge sites and access for the tourism industry, and water rights and water use authorizations. DNR also uses the state Endangered Species Act to preserve natural habitat of species or subspecies of fish and wildlife that are threatened with extinction.[8]

USFWS

The U.S. Fish and Wildlife Service (USFWS) is a bureau within the Department of the Interior. Its objectives include 1) Assisting in the development and application of an environmental stewardship ethic, based on ecological principles, scientific knowledge of fish and wildlife, and a sense of moral responsibility; 2) Guide the conservation, development, and management of the US's fish and wildlife resources. 3) Administer a national program to provide the public opportunities to understand, appreciate, and wisely use fish and wildlife resources. The USFWS functions include enforcement of federal wildlife laws, protection of endangered species, management of migratory birds, restoration of nationally significant fisheries, conservation and restoration of wildlife habitat such as wetlands, help of foreign governments with their international conservation efforts, and distribution of hundreds of millions of dollars, through the Wildlife Sport Fish and Restoration program, in excise taxes on fishing and hunting equipment to State fish and wildlife agencies.[9]

[6] Alaska Department of Environmental Conservation. Accessed 2015. http://dec.alaska.gov/
[7] ADF&G homepage. Accessed 2015. http://www.adfg.alaska.gov/index.cfm?adfg=home.main
[8] Alaska Department of Natural Resources. 2015. Home Page. Accessed 2015. http://dnr.alaska.gov/
[9] US Fish and Wildlife Service. 2015. About Page. Accessed 2015. http://www.fws.gov/help/about_us.html

ANILCA

The Alaska National Interest Lands Conservation Act (ANILCA) directs federal agencies to consult and coordinate with the state of Alaska. State agencies responsible for natural resources management, tourism, and transportation work as a team to provide input throughout federal planning processes.[10]

BOEM

The Bureau of Ocean Energy Management (BOEM) (previously Minerals and Management) is responsible for managing environmentally and economically responsible development and provide safety and oversight of the offshore oil and gas leases. The activities of BOEM and the process for application and approval of oil exploration permits overlaps extensively with evaluations by ADNR, ADFG and ADEC given the potential impacts of such activities on anadromous and other marine resources and their habitat. An example of this is provided by the *Cook Inlet Offshore Oil & Gas Exploration Permit Application & Approval Process*[11]

OPMP

The Department of Natural Resources (DNR) Office of Project Management and Permitting (OPMP) coordinates the review of larger scale projects in the state. Because of the complexity and potential impact of these projects on multiple divisions or agencies, these projects typically benefit from a single primary point of contact. A project coordinator is assigned to each project in order to facilitate interagency coordination and a cooperative working relationship with the project proponent. The office deals with a diverse mix of projects including transportation, oil and gas, mining, federal grants, ANILCA coordination, and land use planning. Every project is different and involves a different mix of agencies, permitting requirements, statutory responsibilities, and resource management responsibilities.[12]

The assessment team considers that the collectivity of: the NEPA process, existing agencies and processes (e.g. ADFG, ADEC, DNM, USFWS, ANILCA OPMP, and BOEM), and the existing intimate and routine cooperation between federal and state agencies managing Alaska's coastal resources is capable of planning and managing coastal developments in a transparent, organized and sustainable way.

Conflict Avoidance in the fisheries sector

With regards to conflict avoidance and resolution between different fisheries, the NPFMC and the BOF tend to avoid conflict by actively involving stakeholders in the process leading up to decision making. The NPFMC and the BOF also have a standing joint committee that meets to resolve

[10] Alaska National Interest Lands Conservation Act (ANILCA). Accessed 2015 http://dnr.alaska.gov/commis/opmp/anilca/

[11] ARCADIS. Cook Inlet Offshore Oil & Gas Exploration Permit Application & Approval Process. Accessed 2015. http://dog.dnr.alaska.gov/Permitting/Documents/Arcadis/Arcadis_Flowchart_CookInletOffshore_Draft.pdf http://www.boem.gov/uploadedFiles/Proposed_OCS_Oil_Gas_Lease_Program_2012-2017.pdf

[12] Alaska Department of Natural Resources. 2015. Welcome to the Office of Project Management & Permitting Homepage. Accessed 2015. http://dnr.alaska.gov/commis/opmp/).

management and allocation issues. The Council and BOF hold an annual coordinating meeting where members consider issues and hear testimony from stakeholders concerning joint Board/Council issues. Both entities provide a great deal of information on their websites, including meeting agendas, discussion papers, and records of decisions. The Council and the BOF actively encourages stakeholder participation, and all their deliberations are conducted in open, public sessions. Effectively, these meetings provide forums for avoidance and resolution of potential fisheries conflicts. Alternatively courts of law provide resolution centers for any legal dispute. In addition, stakeholders may review and submit written comments to the NMFS on proposed rules published in the Federal Register. The Council as part of their process assesses economic, social and cultural value of the fishery resources in order to assist decision-making, allocation and use.

In 2005, the AFSC compiled baseline socioeconomic information about Alaskan fishing communities in the first edition of *Community Profiles for North Pacific Fisheries – Alaska*[13]. Between 2010 and 2011, AFSC went through the process of updating the profiles[14]. A total of 195 communities have now been profiled. The new profiles add a significant amount of new information to help provide a better understanding of each community's reliance on fishing. The profiles include information collected from communities in the Alaska Community Survey, which was conducted during summer 2011, and the Processor Profiles Survey, which was conducted in fall 2011. [15]

The coastal zone is monitored as part of the coastal management process using physical, chemical, biological, economic and social parameters. Involvement include federal and state agencies and programs including the U.S. Forest Service, U.S. Fish and Wildlife Service, NMFS Pacific Marine Environmental Lab (PMEL), the Alaska Department of Environmental Conservation (DEC) Division of Water, ADFG Habitat Division, the AFSC's *"Ecosystem Monitoring and Assessment Program",* The NMFS' Habitat Conservation Division (HCD) and their Essential Fish Habitats (EFH) monitoring and protection program, the U.S. Coast Guard, the NMFS Alaska Regional Office's Restricted Access Management Program (RAM), the Alaska National Interest Lands Conservation Act (ANILCA) federal agencies cooperation directive, and the Department of Natural Resources (DNR) Office of Project Management and Permitting (OPMP) coordinating the review of large scale projects in the state of Alaska.

[13] NOAA-TM-AFSC-160
[14] (NOAA-TM-AFSC-230).
[15] The community profiles are available at the following url: http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php and the latest report at the following url: http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-230.pdf.

3. Management objectives shall be implemented through management rules and actions formulated in a plan or other framework.

FAO CCRF 7.3.3/7.2.2

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating Determination

No significant changes have occurred since the previous surveillance audit in 2014. The Magnuson Stevens Fishery Conservation and Management Act (Magnuson Stevens Act, MSA) is the primary domestic legislation governing management of the nation's marine fisheries. Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, a Fishery Management Plan (FMP) and any necessary amendments, for each fishery under its authority that requires conservation and management. These include Groundfish FMPs for the Gulf of Alaska and the Bering Sea & Aleutian Islands, which incorporate the sablefish fisheries in those regions. Both FMPs present long-term management objectives for the Alaska sablefish fishery. In state waters (0-3 nm), five Alaska sablefish fisheries are managed by ADFG and the BOF outside the IFQ program using a Guideline Harvest Level (GHL). The Aleutian Islands District and Western District of the South Alaska Peninsula Area Sablefish Management Plan (5 AAC 28.640) governs the harvest of sablefish in the Area as described in 5 AAC 28.555(b). 5 AAC 28.360 defines the Cook Inlet Sablefish Management Plan. Sablefish harvest, possession, and landing requirements for Prince William Sound Area are governed under 5 AAC 28.272. Southeast Alaska State managed sablefish (Chatham and Clarence strait) regulations are specified under 5 AAC 28.160 in the Groundfish Commercial Fisheries Regulations. These regulations document long term management objectives for these fisheries.

GOA and BSAI FMPs objectives

Both FMPs present long-term management objectives for the Alaska sablefish fishery. These include sections that describe a Summary of Management Measures and Management and Policy Objectives. The MSA, as amended, sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent. Under the direction of the NPFMC, the GOA and BSAI FMPs define nine management and policy objectives that are reviewed annually. They are:

1) Prevent Overfishing;
2) Promote Sustainable Fisheries and Communities;
3) Preserve Food Webs;
4) Manage Incidental Catch and Reduce Bycatch and Waste;
5) Avoid Impacts to Seabirds and Marine Mammals;
6) Reduce and Avoid Impacts to Habitat;
7) Promote Equitable and Efficient Use of Fishery Resources;
8) Increase Alaska Native Consultation and;
9) Improve Data Quality, Monitoring and Enforcement.

The national standards and management objectives defined in GOA and BSAI FMPs provide adequate evidence to demonstrate the existence of long-term objectives clearly stated in management plans.[16][17]

The BSAI and GOA FMPs define specific management measures to avoid excess fishing capacity and maintain stocks that are economically viable for the fishing communities and industry to harvest and process. Management objectives to promote economic conditions for responsible fisheries take into account the interests of subsistence, small-scale, and artisanal fisheries, define three management objectives to conserve biodiversity of aquatic habitats and protect endangered species; and describe management measures to assess environmental impacts from human activities.

State waters

In state waters (0-3 nm), five Alaska sablefish fisheries are managed by ADFG and the BOF outside the IFQ program using a Guideline Harvest Level (GHL). The Aleutian Islands District and Western District of the South Alaska Peninsula Area Sablefish Management Plan (5 AAC 28.640) governs the harvest of sablefish in the Area as described in 5 AAC 28.555(b). 5 AAC 28.360 defines the Cook Inlet Sablefish Management Plan. Sablefish harvest, possession, and landing requirements for Prince William Sound Area are governed under 5 AAC 28.272. Southeast Alaska State managed sablefish (Chatham and Clarence strait) regulations are specified under 5 AAC 28.160 in the ADFG Groundfish Commercial Fisheries Regulations. The Alaska Wildlife Troopers enforce fisheries regulations in state waters. [18][19][20][21]

GOA Sablefish IFQ Pots

The Council took action to allow the use of longline pot gear in the GOA sablefish IFQ fishery. The preferred alternative gives vessel operators the choice to use either pot longline gear or hook-and-line longline (HAL) gear. Public testimony and the Council's analysis indicated that pot gear could help fishermen reduce the negative effects of whale depredation. Reduced depredation could also mitigate a source of unaccounted sablefish mortality, thus enhancing the precision of stock abundance estimates. The Council selected elements of its preferred alternative that are intended to limit the likelihood and severity of gear conflicts and grounds preemption that might result from the

[16] Fishery Management Plan for the Groundfish of the BSAI; Apr 2015: http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf

[17] Fishery Management Plan for the Groundfish of the GOA; Apr 2015: http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf

[18] ADFG. 2015. 2013-2014 Statewide Commercial Groundfish Fisheries Regulations. http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/Groundfish-2013-2014.pdf

[19] ADFG. 2015. 2015-2016 Statewide Commercial Groundfish Fisheries Regulations. Alaska Department of Fish and Game, P.O. Box 115526, 1255 W. 8th Street, Juneau, AK 99811-5526. http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2015-2016_statewide_commercial_groundfish.pdf

[20] State of Alaska. 2014. Title 5 Fish and Game Part 1 Commercial and Subsistence Fishing and Private Nonprofit Salmon Hatcheries. Chapter 28, Groundfish Fisheries.http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:%27Title5Chap28%27]/doc/{@1}?firsthit

[21] AWT. Accessed 2015. Division of Alaska Wildlife Troopers Mission. 5700 E Tudor Road, Anchorage, AK 99507. http://dps.alaska.gov/AWT/mission.aspx

introduction of a second gear type. IFQ holders who use longline pots are formally encouraged to develop protocols for providing information that helps all fishermen share the fishing grounds. NMFS will report on pot gear effort in its management reports to the Council, and the Council will conduct a review of the fishery three years after rule implementation to identify any need for further management action.

In order to limit the amount of space that pots occupy on the fishing grounds, each vessel is limited in the number of pots that it can deploy in each GOA management area. No more than 120 pots can be used in the West Yakutat or the Southeast Outside districts of the Eastern Gulf. No more than 300 pots can be used in the Central or the Western Gulf. NMFS will establish a system of pot tags to enforce this limitation. Vessels fishing longline pot gear, regardless of their size, must also fill out a NMFS logbook to aid in enforcement. The Council also limited the amount of time that pot gear can be left on the grounds without being moved or tended. Gear cannot be left for more than five days in CGOA and WY, and not for more than seven days in WGOA. Vessels in SE must remove their pots from the grounds when making a sablefish delivery. The different limits reflect the four GOA areas' varied fleet size, fishing area concentration, and run-times to port. To aid in enforcement, vessels using longline pot gear will be required to use VMS, and to declare the status of their pots when making a Prior Notice of Landing. The Council recommended that legal-size halibut caught incidentally in GOA sablefish pots should be retained (by those holding halibut IFQ). Implementation of the halibut retention requirement is contingent upon rulemaking by IPHC, which would not occur until early 2016. If IPHC does not make longline pots a legal gear for halibut, any halibut caught in this fishery with pot gear would have to be discarded.[22]

5 AAC 28.089 Guiding Principles for groundfish fishery regulations

With state groundfish management expanding to cover the groundfish resources in the waters of Alaska, the Board of Fisheries (board) receives regulatory proposals for these fisheries. The board considers, to the extent practicable, the following guiding principles when taking actions associated with the adoption, amendment, or repeal of regulations regarding groundfish fisheries:

(1) conservation of the groundfish resource to ensure sustained yield, which requires that the allowable catch in any fishery be based upon the biological abundance of the stock;

(2) minimization of bycatch of other associated fish and shellfish and prevention of the localized depletion of stocks;

(3) protection of the habitat and other associated fish and shellfish species from non sustainable fishing practices;

(4) maintenance of slower harvest rates by methods and means and time and area restrictions to ensure the adequate reporting and analysis necessary for management of the fishery;

(5) extension of the length of fishing seasons by methods and means and time and area restrictions to provide for the maximum benefit to the state and to regions and local areas of the state;

(6) harvest of the resource in a manner that emphasizes the quality and value of the fishery product;

(7) use of the best available information presented to the board; and

(8) cooperation with the North Pacific Fisheries Management Council (NPFMC) and other federal agencies associated with groundfish fisheries management.[23][24]

[22] North Pacific Fisheries Management Council. News and Notes April 2015. Accessed 2015. http://www.npfmc.org/wp-content/PDFdocuments/newsletters/news415.pdf

[23] Title 5 . Fish and Game. Chapter 28 . Transportation, Possession and Release of Live Fish; Aquatic Farming; Section 89. 5 AAC 28.089. Guiding principles for groundfish fishery regulations http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section089.htm

B. Science and Stock Assessment Activities

4. There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.

FAO CCRF 7.1.9/7.4.4/7.4.5/7.4.6/8.4.3/12.4
ECO 29.1-29.3

Evidence adequacy rating:
☑ High **☐ Medium** **☐ Low**

Rating determination

The NMFS and ADFG collect fishery data and conduct fishery independent surveys (longline and trawl) to assess the sablefish populations and ecosystems in GOA and BSAI areas. GOA and BSAI SAFE documents provide complete descriptions of data types and time series of collections. The NMFS/AFSC conducts annual sablefish longline surveys on the continental slope of the eastern Bering Sea, Aleutian Islands, and the GOA. In state waters, fishery independent data come from longline and trawl surveys as well as mark-recapture studies in the NSEI. Fishery dependent data are collected from fixed gear (longline and pot) vessels which target sablefish in the federal IFQ fishery and trawl fisheries that catch sablefish as retained bycatch in other fisheries such as rockfish and sole. Records of catch and effort for these vessels are recorded through the e-landing (electronic fish tickets) catch recording system and also collected by observers and by vessel captains in voluntary and required logbooks. A new Observer Program designed to expand coverage to vessels less than 60 feet long and to provide more flexibility to meet management needs was implemented in 2013 and continued in 2014. The data available for this stock have been updated annually where possible, and provide sufficient information for indices used in the stock assessment models. Ecosystem considerations for the sablefish stock and fisheries are reported in the sablefish SAFE report, and economic analyses are also carried out.

[24] ADFG. 2015. 2013-2014 Statewide Commercial Groundfish Fisheries Regulations. http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/Groundfish-2013-2014.pdf

Table B4.1. Summary of data sources, types and years available for the sablefish stock.[25]

Source	Data	Years
Fixed gear fisheries	Catch	1960-2014
Trawl fisheries	Catch	1960-2014
Japanese longline fishery	Catch-per-unit-effort (CPUE)	1964-1981
U.S. fixed gear fishery	CPUE, length	1990-2013
	Age	1999-2013
U.S. trawl fisheries	Length	1990,1991,1999, 2005-2013
Japan-U.S. cooperative longline survey	CPUE, length	1979-1994
	Age	1981, 1983, 1985, 1987, 1989, 1991, 1993
Domestic longline survey	CPUE, length	1990-2014
	Age	1996-2013
NMFS GOA trawl survey	Abundance index	1984, 1987, 1990, 1993, 1996, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013
	Lengths	1984, 1987, 1990, 1993, 1996, 1999, 2003, 2005, 2007, 2009, 2011, 2013

New data included in the 2014 assessment (years listed in the table in larger font) were relative abundance and length data from the 2014 longline survey, relative abundance and length data from the 2013 longline fishery, length data from the 2013 trawl fisheries, age data from the 2013 longline survey and 2013 fixed gear fishery, updated historical catches from 2006 to 2013, and projected 2014- 2016 catches.[26]

Fishery independent data

A number of fishery independent surveys catch sablefish. The NMFS/AFSC longline survey and GOA bottom trawl survey are used to provide indices for the stock assessment model, by collecting sablefish data for catch, effort, age, length, weight, and maturity. Some other surveys occur in the same or adjacent geographical areas, and although these are not included as separate indices in the model, they are used by the stock assessment authors to provide trends and comparative analyses to the AFSC longline survey. Such surveys include the IPHC setline survey, and various surveys by ADFG and DFO.

Longline surveys

NMFS/AFSC has conducted annual longline surveys (Japan-U.S. cooperative longline survey, 1978-94; 1987-present, domestic longline survey). The survey has covered the upper continental slope (1978-present) and selected gullies (1987- present) of the Gulf of Alaska and the upper continental slope of the eastern Bering Sea (1982-94, biennially since 1997) and Aleutian Islands

[25] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. North Pacific Fishery Management Council, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424 (GOA report), pp. 575-717 (BSAI Report)
http://www.afsc.noaa.gov/REFM/Docs/2014/goasablefish.pdf
http://www.afsc.noaa.gov/REFM/Docs/2014/BSAIsablefish.pdf

[26] Ibid.

region (1980 94, biennially since 1996). The survey lasts approximately three months during summer, and is currently conducted jointly by two components of the AFSC: the Auke Bay Laboratory and the Resource Assessment and Conservation Engineering Division. Survey protocols are described by Sigler and Lundsford, of the AFSC.[27]

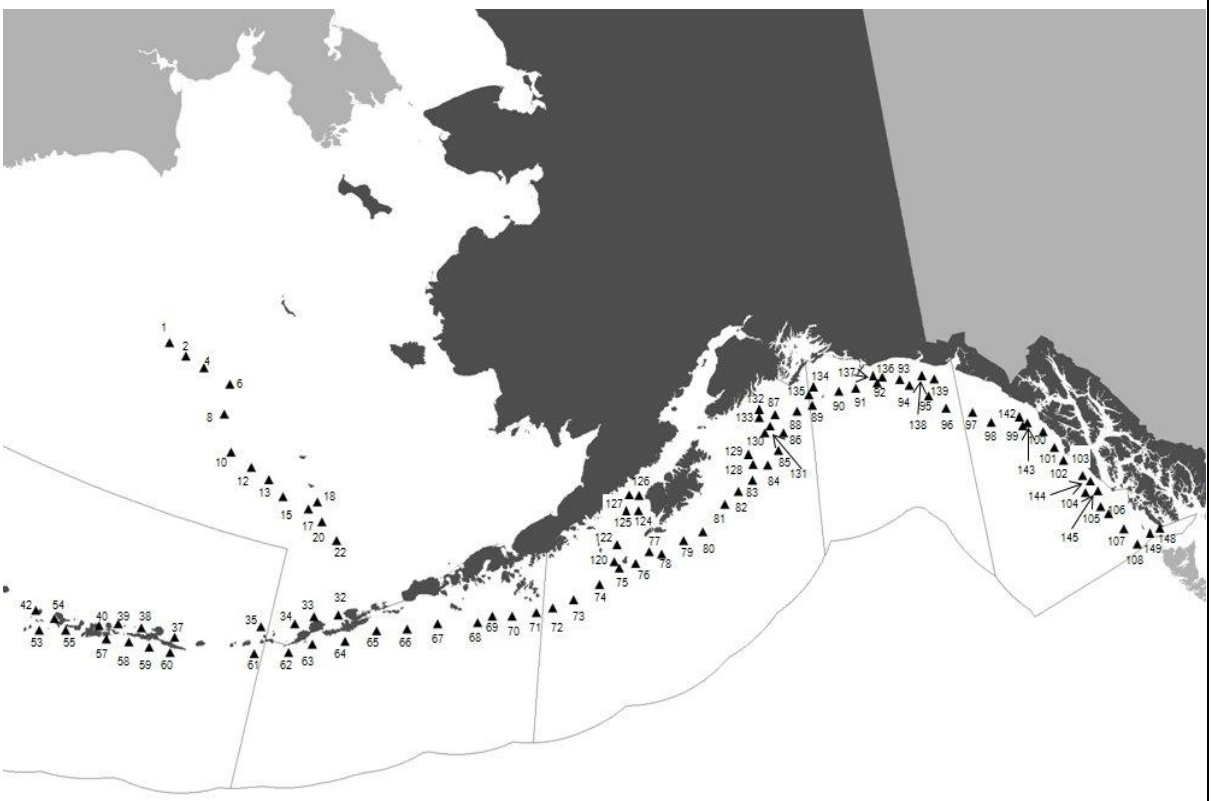


Fig. B4.1. Location of stations for NMFS/AFSC longline survey.[28]

The survey objectives include: 1) Determining the relative abundance and size composition of commercially important species including sablefish, Greenland turbot (*Reinhardtius hippoglossoides*) and rockfishes (Sebastes sp.); 2) Determining migration patterns of sablefish, and other species by tag and release methods; and 3) Determining the age composition of sablefish through otolith collections. The survey covers the upper continental slope and selected gullies of the eastern Bering Sea, Aleutians Islands region, and Gulf of Alaska (Figure B4.1). It surveys nearly all areas where adult sablefish are found, with depths ranging from about 150 to 1,000 m. Survey operations are conducted using a chartered U.S. longline freezer vessel with overall length of about 55 m.[29] The survey began annual sampling of the GOA in 1987, biennial sampling of the AI in 1996, and biennial sampling of the eastern BS in 1997.

[27] Alaska Fisheries Science Center Survey protocol for the Alaska sablefish longline survey By Michael F. Sigler and Chris R. Lunsford http://www.afsc.noaa.gov/ABL/MESA/pdf/LSprotocols.pdf

[28] Location of stations for NMFS/AFSC longline survey. http://www.afsc.noaa.gov/maps/longline/PrintMap.php

[29] Alaska Fisheries Science Center Survey protocol for the Alaska sablefish longline survey Michael F. Sigler and Chris R. Lunsford http://www.afsc.noaa.gov/ABL/MESA/pdf/LSprotocols.pdf

The survey protocols note that catches are adjusted for killer whale depredation because removals are large, easily detected and documented, and there is historic information on occurrence to adjust historic catches. Catches are not adjusted for sperm whale depredation because the removals are relatively small, depredation occurs only occasionally, and in any case there is a lack of information on occurrence to adjust historic catches. The 2014 SAFE authors[30] note that a previous study estimated that sperm whales decreased the EY/SE area index by 1-10% annually (which is not corrected for), while killer whales affected the Western GOA index by 5-30% annually (which is corrected for).

Relative population abundance indices are computed annually using survey catch rates from stations sampled on the continental slope. Highest sablefish abundance indices occurred during the mid-1980's, in response to exceptional recruitment in the late 1970's. Survey indices of abundance declined through the 1990's in most areas, and trended down through 2009. Following unexpectedly large increases in 2010 and 2011, the 2012 and 2013 estimates were below expectations. The 2013 survey estimate of relative abundance in numbers (RPN) was at the lowest point in the domestic time series; however, in 2014 there was an overall increase of 15% from 2013. The individual areas that contributed to the increase were WGOA (67%), WY (21%), and EY/SE (13%). Despite the modest increases, the index is still below average because of recent weak recruitment.[31]

The International Pacific Halibut Commission (IPHC) conducts a long line survey in Alaskan waters each year to assess Pacific halibut. This survey differs from the AFSC long line survey in gear configuration and sampling design, but catches substantial numbers of sablefish. Because the majority of effort occurs on the shelf in shallow depths, the IPHC survey may catch smaller and younger sablefish than the AFSC survey; however, measurements of sablefish are not taken on the IPHC survey. NPUE of sablefish generally declined over the last 10 years in most of the areas covered by the IPHC survey.[32]

Trawl Surveys

Trawl surveys of the upper continental slope that adult sablefish inhabit have been conducted biennially or triennially since 1980 in the AI, and 1984 in the GOA, always to 500 m and occasionally to 700-1000 m. Trawl surveys of the BS slope were conducted biennially from 1979-1991 and redesigned and standardized for 2002, 2004, 2008, 2010, 2012, and 2014. Trawl surveys of the BS shelf are conducted annually but generally catch no sablefish. Trawl survey abundance indices were not used in the assessment model prior to 2007 because, according to the SAFE authors[33], they were not considered good indicators of the sablefish relative abundance.

[30] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. North Pacific Fishery Management Council, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424

[31] Ibid. .

[32] Henry, E., E.Soderlund, C.L. Dykstra, T. Geernaert, A.M. Ranta, and T.Kong. 2014. Standardized stock assessment survey. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2014: 531-568. http://www.iphc.int/publications/rara/2014/rara2014_33ssasurvey.pdf

[33] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands

However, there is a long time series of data available and given the trawl survey's ability to sample smaller fish, it may be a better indicator of recruitment than the longline survey.
There is some difficulty with combining estimates from the BS and AI with the GOA estimates since they occur on alternating years. Therefore only the GOA trawl survey (<500 m depth) biomass estimates and length data are used as a recruitment index for the whole population. A higher proportion of young fish (age 2, fork length about 45 cm) are susceptible to trawl gear compared to longline gear because trawl fisheries usually occur on the continental shelf and shelf break inhabited by younger fish, and catching small sablefish may be hindered by the large bait and hooks on longline gear.The authors of the stock assessment note that the largest proportion of sablefish biomass is in the GOA so it should be indicative of the overall population.[34] Biomass estimates for 1984-2013 were used in the assessment. The GOA trawl survey index was at its lowest level of the time series in 2013, down 29% from 2011.

Tagging Studies
Tagging effort in Alaska has been centered in three main areas: 1) adult sablefish in offshore waters of the GOA, BS, and AI; 2) adult sablefish in the inside waters of Chatham and Clarence Straits; and 3) juvenile sablefish in SE Alaska. NMFS manages the tagging program but cooperates with ADFG in Southeast Alaska Chatham and Clarence Straits. Although not used in federal stock assessment models, tagging studies offer an independent check on the population and migration.

A recent analysis [35] of over 300 000 tag releases in Alaska and over 27 000 tag recoveries from 1979 to 2009 quantified annual movement probabilities among areas for three size groups of sablefish. Annual movement probabilities were high, ranging from 10% to 88% depending on area of occupancy at each time step and size group. Overall, movement probabilities were very different between areas of occupancy and moderately different between size groups. Estimated annual movement of small sablefish from the central Gulf of Alaska had the reverse pattern of a previous study, with 29% moving westward and 39% moving eastward. Movement probabilities also varied annually, with decreasing movement until the late 1990s and increasing movement until 2009. Year-specific magnitude in movement probability of large fish was highly negatively correlated with female spawning biomass estimates from the federal stock assessment. Mean mortality estimates from time at liberty were similar to the federal stock assessment. The authors of the study concluded[36] that incorporating these tag related data into a fully age-structured spatial stock assessment model will inform harvest apportionment strategies to conserve spawning biomass and maximize future yields. However, it was concluded in the 2014 SAFE that it would be premature at this time to revise the apportionment strategy until further analyses have been completed.

and Gulf of Alaska Regions. North Pacific Fishery Management Council, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424.
[34] Ibid.
[35] Hanselman, D.H., J. Heifetz, K.B. Echave, and S.C. Dressel. 2015. Move it or lose it: movement and mortality of sablefish tagged in Alaska. Canadian Journal of Fisheries and Aquatic Sciences, 2015, 72:238-251, 10.1139/cjfas-2014-0251. http://www.nrcresearchpress.com/doi/abs/10.1139/cjfas-2014-0251#.Ve3QYhFVikp
[36] Ibid.

State waters sablefish fishery independent data

ADFG has a well-developed research capacity. In 1988, the department began annual longline research surveys in both Northern southeast inside (NSEI – Chatham Strait) and Southern southeast inside (SSEI – Clarence Strait) subdistricts to assess the relative abundance of sablefish over time and differing environmental conditions. Fixed sampling stations were randomly assigned within statistical areas in both Chatham and Clarence Strait, where the majority of state fleet fishing effort is focused. Once established, the same stations are fished in a similar manner each year to estimate change in relative abundance over time. A general linear multivariate model (GLM) has been used to detect significant CPUE trends over time. Biological data collected during the surveys include length, weight, sex, stage of maturity and otoliths. This data is used to describe the age and size structure of the populations and detect recruitment events. ADFG has standardized its survey methods with the NMFS survey. Stock assessment for the other state fisheries for sablefish is not conducted by ADFG; instead they use assessment data from NMFS (See clause 5 below for more details).

ADFG conducted a sablefish tagging event in the NSEI Subdistrict using the ADFG vessel, R/V Medeia, from May 21–June 14, 2013. Sablefish were captured using pot gear, tagged, and released. Tagged fish were planned for recovery in the 2013 ADFG longline survey, commercial, subsistence, personal use, and recreational fisheries. The resultant data were used to calculate a biomass estimate and set the 2014 NSEI Subdistrict commercial sablefish AHO. No sablefish marking event was conducted in the NSEI Subdistrict in 2014 due to a reduction in legislative general funds and because of a time conflict with scheduled survey vessel maintenance. Due to the continued reduction in funds, sablefish marking will be conducted every second year, beginning in May 2015.

The survey CPUE for NSEI area increased in 2014 to 1.46 lb/hook from 1.40 lb/hook in 2013. In the SSEI stock assessment, there was a decline in the overall longline survey CPUE index (round lb/hook) from 2013 (0.67) to 2014 (0.61). There is a high proportion of immature fish in the longline and pot fisheries (>60% from 2012–2014) and in the survey (>73% from 2012–2014). In 2013, the survey was redesigned to expand survey station coverage in Dixon Entrance as well as increase the minimum spacing between survey stations. The Dixon Entrance area is an important area to the commercial fishery (40 to 60% of the annual commercial harvest), yet this area had been underrepresented in the department survey. The new survey design was used for the 2013 and 2014 SSEI longline surveys.

The 2013 ADFG longline survey took place July 28–August 3, 2013. Data from the 2013 longline survey were used to obtain current size, age, and sexual maturity information for the 2014 stock assessment. [37] Three vessels were chartered for the 2014 ADF&G longline survey, which was run from July 31 to August 6, 2014.[38] It is expected that the results of the 2014 survey will be available for use in the 2015 stock assessment.

[37] ALASKA DEPARTMENT OF FISH AND GAME DIVISION of COMMERCIAL FISHERIES & DIVISION of SPORT FISH April 2015 STATE OF ALASKA GROUNDFISH FISHERIES ASSOCIATED INVESTIGATIONS IN 2014 http://www.psmfc.org/tsc-drafts/2015/2014_AK_TSC_ALaska_draftfinal.pdf

Fishery dependent data

Fishery data are collected from fixed gear (longline and pot) vessels, which target sablefish in the IFQ fishery plus trawl fisheries that catch sablefish as retained bycatch in other fisheries such as those for rockfish and sole. NMFS tracks in-season catches and IFQ balances. As noted in the 2014 stock assessment[39], exceptional recruitment fuelled increased abundance and increased catches during the late 1980's, which coincided with the domestic fishery expansion. Catches declined during the 1990's, increased in the early 2000s, and have since declined to near 12,000 t (Table B4.2, Figure B4.2). TACs in the GOA are nearly fully utilized while TACs in the BS and AI are rarely fully utilized (Table B4.3).

eLandings

The "eLanding" system is an electronic fish ticket system, for all catch data required to be reported in regulation. eLandings supports the internet-based Interagency Electronic Reporting System (IERS) for reporting commercial fishery landings and/or production data, including IFQ/CDQ halibut and sablefish. It is a collaborative project with NMFS, ADFG and the International Pacific Halibut Commission (IPHC).

Revisions to catches

For the 2014 assessment, sablefish catches since 2006 have been altered substantively in the Alaska Regional Office Catch Accounting System (CAS) revisions. The years 2006-2009 were particularly different than reported in the 2013 SAFE. These estimates of catch have been updated and corrected to account for selected landings and associated catch that were inadvertently not being counted against the Federal ABC. The missing records were a result of the transition to the eLandings system and the fact that not all processors were using the system in those years. This resulted in a net total increase of about 1,500 t to the sablefish catch in since 2005, with the biggest relative increase in 2007, just under 2/3 of the total.[40]

State fishery data

The data used in the Alaskan sablefish stock assessment includes catches from minor state-managed fisheries in the northern GOA and in the AI region because fish caught in these state waters are reported on the eLandings reporting system using the area code of the adjacent federal waters. The eLandings information feeds directly into the Alaska Regional Office catch reporting system, which is the source of the catch data used in this assessment. Table B4.4 (a, b, c) shows the recent state catch data for sablefish in SE Alaska, Prince William Sound, and Cook Inlet. The only sablefish fishery in the Westward Region occurs in the Aleutian Islands.[41] The GHL for this

[38] ALASKA DEPARTMENT OF FISH AND GAME DIVISION OF COMMERCIAL FISHERIES NEWS RELEASE 2014 NORTHERN SOUTHEAST INSIDE (NSEI) SUBDISTRICT SABLEFISH FISHERY ANNUAL HARVEST OBJECTIVE ANNOUNCEMENT http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/431292948.pdf

[39] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. NPFMC, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424.

[40] Ibid.

[41] ALASKA DEPARTMENT OF FISH AND GAME DIVISION OF COMMERCIAL FISHERIES NEWS RELEASE 2014 ALEUTIAN ISLANDS STATE-WATERS SABLEFISH GUIDELINE HARVEST LEVEL AND SEASON OPENING ANNOUNCED

fishery is set at 5% of the combined Bering Sea/Aleutian Islands TAC, and less than 50% of this level was utilized in 2014 (Table B4.3).

Table B4.2. Alaska sablefish catch (t). The values include landed catch and discard estimates. Discards were estimated for U.S. fisheries before 1993 by multiplying reported catch by 2.9% for fixed gear and 26.9% for trawl gear (1994-1997 averages) because discard estimates were unavailable. Eastern includes West Yakutat and East Yakutat / Southeast. 2014 catches are estimated for the full year (www.akfin.org).[42]

		BY AREA								BY GEAR	
Year	Grand total	Bering Sea	Aleu-tians	Western	Central	Eastern	West Yakutat	East Yak/SEO	Un-known	Fixed	Trawl
1960	3,054	1,861	0	0	0	1,193			0	3,054	0
1961	16,078	15,627	0	0	0	451			0	16,078	0
1962	26,379	25,989	0	0	0	390			0	26,379	0
1963	16,901	13,706	664	266	1,324	941			0	10,557	6,344
1964	7,273	3,545	1,541	92	955	1,140			0	3,316	3,957
1965	8,733	4,838	1,249	764	1,449	433			0	925	7,808
1966	15,583	9,505	1,341	1,093	2,632	1,012			0	3,760	11,823
1967	19,196	11,698	1,652	523	1,955	3,368			0	3,852	15,344
1968	30,940	14,374	1,673	297	1,658	12,938			0	11,182	19,758
1969	36,831	16,009	1,673	836	4,214	14,099			0	15,439	21,392
1970	37,858	11,737	1,248	1,566	6,703	16,604			0	22,729	15,129
1971	43,468	15,106	2,936	2,047	6,996	16,382			0	22,905	20,563
1972	53,080	12,758	3,531	3,857	11,599	21,320			15	28,538	24,542
1973	36,926	5,957	2,902	3,962	9,629	14,439			37	23,211	13,715
1974	34,545	4,258	2,477	4,207	7,590	16,006			7	25,466	9,079
1975	29,979	2,766	1,747	4,240	6,566	14,659			1	23,333	6,646
1976	31,684	2,923	1,659	4,837	6,479	15,782			4	25,397	6,287
1977	21,404	2,718	1,897	2,968	4,270	9,543			8	18,859	2,545
1978	10,394	1,193	821	1,419	3,090	3,870			1	9,158	1,236
1979	11,814	1,376	782	999	3,189	5,391			76	10,350	1,463
1980	10,444	2,205	275	1,450	3,027	3,461			26	8,396	2,048
1981	12,604	2,605	533	1,595	3,425	4,425			22	10,994	1,610
1982	12,048	3,238	964	1,489	2,885	3,457			15	10,204	1,844
1983	11,715	2,712	684	1,496	2,970	3,818			35	10,155	1,560
1984	14,109	3,336	1,061	1,326	3,463	4,618			305	10,292	3,817
1985	14,465	2,454	1,551	2,152	4,209	4,098			0	13,007	1,457
1986	28,892	4,184	3,285	4,067	9,105	8,175			75	21,576	7,316
1987	35,163	4,904	4,112	4,141	11,505	10,500			2	27,595	7,568
1988	38,406	4,006	3,616	3,789	14,505	12,473			18	29,282	9,124
1989	34,829	1,516	3,704	4,533	13,224	11,852			0	27,509	7,320
1990	32,115	2,606	2,412	2,251	13,786	11,030			30	26,598	5,518
1991	27,073	1,318	2,168	1,821	11,662	10,014			89	23,124	3,950
1992	24,932	586	1,497	2,401	11,135	9,171			142	21,614	3,318
1993	25,417	669	2,078	740	11,955	9,976	4,620	5,356	0	22,912	2,506
1994	23,577	694	1,725	539	9,376	11,243	4,493	6,750	0	20,639	2,938
1995	20,692	930	1,119	1,747	7,673	9,223	3,872	5,352	0	18,079	2,613
1996	17,275	648	764	1,542	6,773	7,548	2,893	4,655	0	15,088	2,187
1997	14,607	552	781	1,374	6,234	5,666	1,930	3,735	0	12,975	1,632
1998	13,867	563	535	1,432	5,915	5,422	1,956	3,467	0	12,380	1,487
1999	13,585	675	681	1,488	5,874	4,867	1,709	3,159	0	11,601	1,985
2000	15,565	742	1,049	1,582	6,173	6,020	2,066	3,953	0	13,546	2,019
2001	14,064	864	1,074	1,588	5,518	5,021	1,737	3,284	0	12,281	1,783
2002	14,748	1,144	1,119	1,865	6,180	4,441	1,550	2,891	0	12,505	2,243
2003	16,411	1,012	1,118	2,118	6,993	5,170	1,822	3,347	0	14,351	2,060
2004	17,518	1,041	955	2,170	7,310	6,041	2,241	3,801	0	15,861	1,656
2005	16,580	1,070	1,481	1,929	6,701	5,399	1,824	3,575	0	15,024	1,556
2006	15,551	1,079	1,151	2,151	5,921	5,251	1,889	3,362	0	14,305	1,246
2007	15,957	1,182	1,168	2,101	6,003	5,502	2,074	3,429	0	14,721	1,235
2008	14,674	1,141	901	1,679	5,543	5,410	2,056	3,354	0	13,552	1,122
2009	13,128	916	1,100	1,423	5,005	4,684	1,831	2,853	0	12,071	1,057
2010	11,980	755	1,094	1,354	4,508	4,269	1,578	2,690	0	10,976	1,004
2011	12,971	705	1,024	1,402	4,919	4,921	1,896	3,024	0	11,792	1,179
2012	13,868	743	1,205	1,353	5,329	5,238	2,033	3,205	0	12,767	1,102
2013	13,642	634	1,062	1,385	5,207	5,354	2,106	3,247	0	12,604	1,038
2014	11,476	328	757	1,090	4,737	4,564	1,707	2,857	0	10,486	990

http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/384995846.pdf

[42] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. North Pacific Fishery Management Council, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424.

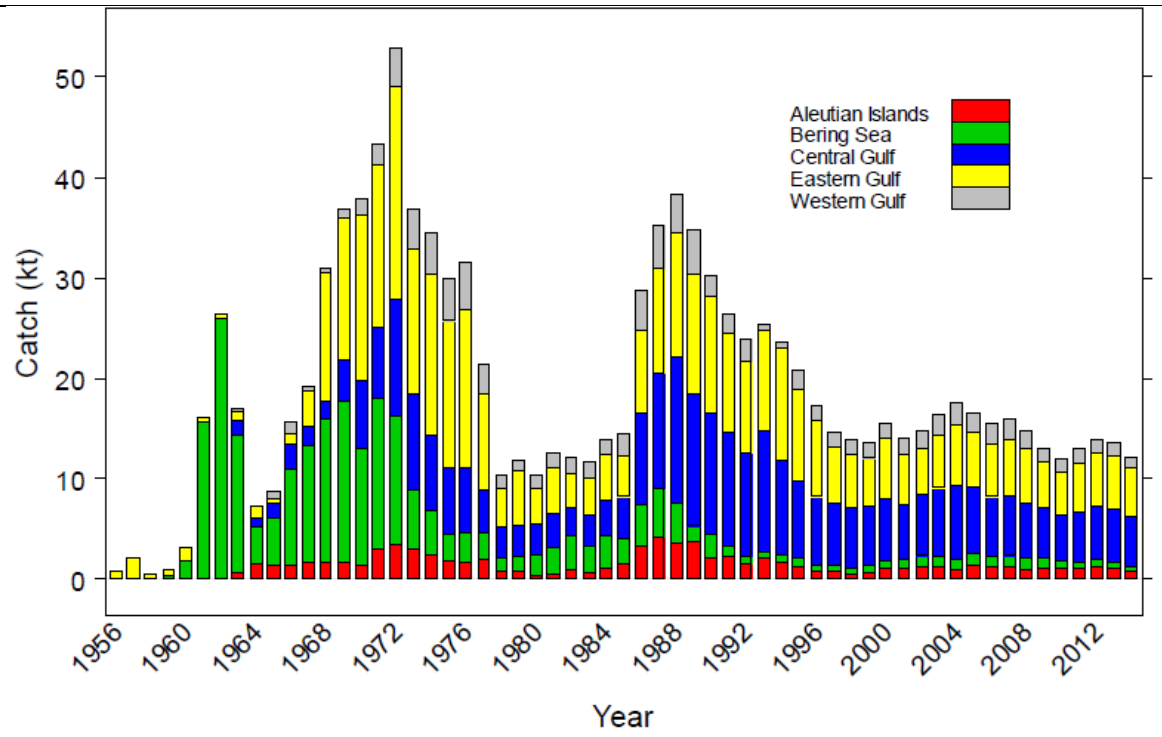


Figure B4.2. Sablefish fishery total reported catch (kt) by NPFMC area and year.[43]

Table B 4.3. 2014 IFQ sablefish allocations and IFQ landings.[44]

				TAC		
Area	**Species**	**Vessel Landings**	**Total Catch Pounds**	**Allocation Pounds**	**Remaining Pounds**	**Percent Landed**
AI	sablefish	77	1,148,967	2,394,196	1,245,229	48
BS	sablefish	100	426,211	1,181,666	755,455	36
CG	sablefish	605	8,226,952	8,256,227	29,275	100
SE	sablefish	538	5,919,469	5,941,397	21,928	100
WG	sablefish	171	2,441,310	2,610,246	168,936	94
WY	sablefish	207	3,252,008	3,295,877	43,869	99
	Total	**1,698**	**21,414,917**	**23,679,609**	**2,264,692**	**90**

[43] Ibid.

[44] NOAA Fisheries Service Individual Fishing Quota (IFQ) Allocations and Landings For Fishing Year 2014 http://alaskafisheries.noaa.gov/ram/ifq/14ifqland.pdf

Table B4.4a. SE Alaska Sablefish harvest and GHL (round lb.) (information accessed Sept 7, 2015)[45]

Year	Fishery	Total Quota	Individual Quota	Estimated Catch	Remaining Catch	Permits	Status
2015	NSEI Longline	786,748	10,087	0	786,748	78	Open
	SSEI Combined	536,618	23,331	394,059	142,559	23	Closed
	SSEI Longline		23,331			20	Closed
	SSEI Pot		23,331			3	Closed
2014	NSEI Longline	745,774	9,561	675,207	70,567	78	
	SSEI Combined	536,618	23,331	494,760	41,858	23	
2013	NSEI Longline	1,002,162	12,848	971,499	30,663	78	
	SSEI Combined	583,280		505,599	77,681	23	
2012	NSEI Longline	975,000	12,342	969,535	5,465	79	
	SSEI Combined	583,280	25,360	521,825	61,455	23	
2011	NSEI Longline	880,000	10,602	882,779	-2,779	83	
	SSEI Combined	583,280	23,300	540,931	42,349	25	
2010	NSEI Longline	1,063,000	12,218	1,054,275	8,725	87	
	SSEI Combined	634,000	23,400	558,633	75,367	27	
2009	NSEI Longline	1,071,000	12,170	1,071,554		88	
	SSEI Combined	634,000	22,650	595,748		28	

Table B4.4b. Prince William Sound Sablefish harvest and GHL (round lb.) (accessed Sept 7, 2015)[46]

Dol Year	GHL	Harvest
2015	122,000	16,702
2014	242,000	96,777
2013	242,000	155,448
2012	242,000	203,824
2011	242,000	222,099
2010	242,000	212,229
2009	242,000	219,438
2008	242,000	206,929

Table B4.4c. Cook Inlet Sablefish harvest and GHL (round lb.) (accessed Sept 7, 2015)[47]

[45] ADF&G Sablefish Fishery Update for SE Alaska http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.sablefish_fishery_update

[46] ADF&G Prince William Sound Sablefish GHL http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareapws.pws_groundfish_sablefish_harvest

[47] ADF&G Cook Inlet Sablefish Guideline Harvest Level http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareacookinlet.cookinlet_groundfish_sablefish_harvest

Year	Vessel Count	GHL	Harvest
2015	3	55,500	18,819
2014	5	56,000	50,703
2013	8	66,000	42,287
2012	12	69,000	67,452
2011	10	56,473	57,350
2010	9	53,700	55,899
2009	13	60,000	55,263
2008	12	66,000	68,852

Observer Program and data

At-sea and plant observers provide additional fishery data for catch, length and age. The restructured NMFS North Pacific Groundfish Observer Program went into effect on January 1, 2013. Program changes restructured the funding and deployment system for observers and expanded observer coverage to vessels less than 60 feet length overall (LOA). To establish the program, NMFS approved amendments in 2012 to the Groundfish FMPs of the BSAI (Amendment 86), and the GOA (Amendment 76). The purpose of restructuring the Observer Program was to reduce the potential for bias in observer data (e.g. spatial and temporal bias in coverage, as well as examining whether data from observed vessels differ significantly from data from unobserved vessels); authorize the collection of observer data in fishing sectors that were previously not required to carry observers; allow fishery managers to provide observer coverage to respond to the scientific and management needs; and assess a broad-based fee to more equitably distribute the costs of observer coverage.

The Observer Program allows NMFS to determine when and where to deploy observers using funds from fees based on the retained value of harvested groundfish and halibut fisheries. All sectors of the groundfish fishery, including vessels less than 60 feet LOA and the commercial halibut sector, are included in the new Observer Program. Coverage levels and deployment schedules were designed to reduce the potential bias in observer data, increase data collection in fleet sectors previously not covered by observers, to allow managers to respond to management needs in specific fisheries, and to more equitably distribute costs of observer coverage. Sampling by observers may occur at shoreside processors, floating processors, or onboard vessels at-sea. The Program is fine-tuned through yearly Annual Deployment Plans (ADP), with first changes being made in 2014, and additionally in 2015.

The NPFMC approved the Annual Deployment Plan for 2015[48] with the following recommendations:

- Use trip selection strata to assign vessels in 2015.
- Using two selection strata for 2015: small vessel trip selection and large vessel trip selection.
- Use 12% selection probability for the small vessel trip selection stratum and 24% selection probability for the large vessel stratum.
- Allow conditional releases in 2015 for vessels in the small vessel trip selection stratum

[48] http://www.npfmc.org/observer-program (Item C1, Observer ADP Council Motion – FINAL 10/9/14)

that: 1) do not have sufficient life raft capacity to accommodate an observer, and/or 2) to assist in addressing bunk space limited vessels, have been selected for two consecutive trips (e.g., the third consecutive trip is released).

- Vessels selected by NMFS to participate in EM Cooperative Research will be in the no selection pool while participating in such research.
- Trawl vessels that fish for Pacific cod in the BSAI will be given the opportunity to opt-in to full observer coverage and carry an observer at all times while fishing in the BSAI using the same approach as 2014.
- The Annual Report will include information to evaluate a sunset provision, including information on the potential for bias that could be introduced through life raft conditional release, the costs to an individual operator of upgrading to a larger life raft, and the enforcement disincentives from downgrading one's life raft.

A detailed report on the observer program is published annually by NOAA/NMFS. The most recent report[49] provides information and recommendations based on deployment of observers in 2014. The budget for observer deployment in 2014 in the partial coverage category was $4,937,414 and 4,368 days. The budget for 2014 was made up of $3,044,606 in fees (from 2013 landings) and $1,892,808 in federal money. The breakdown in contribution to the 2014 observer fee liability by species was: 30% halibut, 22% sablefish, 26% Pacific cod, 19% pollock, and 2% all other groundfish species. In 2014, NMFS deployed observers for 4,368 days, or 92.6% of the anticipated budget. The program met expected rates of coverage for the full-coverage regulatory and full-coverage voluntary strata, the trip selection stratum, four of six time-periods within vessel selection, and the partial coverage no selection. In examining its recommendations for previous and future years, NMFS envisions that future reporting will expand key performance metrics to improve understanding of the Observer Program performance. NMFS has already noted progress on incorporating variances associated with catch estimates, and will continue to report as work progresses.[50]

Tables B4.5 (a,b) show some catch (retained and discard) estimates from the Observer Program in the Gulf of Alaska and Bering Sea/Aleutian Islands in 2014[51]. Data are shown for catcher/processor and catcher vessels in each area.

Table 4.5a. Total catch (retained and discard) of groundfish species and halibut (mt) caught in 2014 by catcher/processors (upper panel), and catcher vessels (lower panel) in the Gulf of Alaska.

[49] NMFS (National Marine Fisheries Service). 2015. North Pacific Groundfish and Halibut Observer Program 2014 Annual Report. National Oceanic and Atmospheric Administration, 709 West 9th Street. Juneau, Alaska 99802. https://alaskafisheries.noaa.gov/sustainablefisheries/observers/annualrpt2014.pdf
[50] Ibid.
[51] Ibid.

Sector	Species Caught	Trip Disposition	Hook and Line Retained	Hook and Line Discard	Jig Retained	Jig Discard	Non-Pelagic Trawl Retained	Non-Pelagic Trawl Discard	Pot Retained	Pot Discard	Pelagic Trawl Retained	Pelagic Trawl Discard
Catcher/ Processor	Deepwater Flatfish	Observed	11	51			23,021	839			5	<1
		Total	11	54			24,181	1,254			5	<1
	Halibut	Observed		790				648				<1
		Total		806				703				<1
	Other groundfish	Observed	1	169			1,034	300				2
		Total	1	169			1,114	300				2
	Pacific cod	Observed	5,788	160			1,051	1,321				
		Total	5,900	160			1,211	1,356				
	Pollock	Observed	22	5			1,626	509			15	2
		Total	22	5			1,648	509			15	2
	Rockfish	Observed	69	119			12,184	986			1,798	54
		Total	81	124			12,211	1,091			1,798	54
	Sablefish	Observed	417	9			433	44			<1	<1
		Total	511	9			433	45			<1	<1
	Shallow-water flats	Observed	<1	7			978	84				<1
		Total	<1	7			994	84				<1
	Skates	Observed	79	353				352				
		Total	79	359				381				
	Sharks	Observed		14				136				
		Total		14				168				

Sector	Species Caught	Trip Disposition	Hook and Line Retained	Hook and Line Discard	Jig Retained	Jig Discard	Non-Pelagic Trawl Retained	Non-Pelagic Trawl Discard	Pot Retained	Pot Discard	Pelagic Trawl Retained	Pelagic Trawl Discard
Catcher Vessel	Deepwater Flatfish	Observed		32			1,353	331	1	<1	92	1
		Total	<1	214	<1		14,025	2,248	2	1	771	14
	Halibut	Observed	1,095	1,153				188		1		2
		Total	8,245	8,038	11			1,316		62		2
	Other groundfish	Observed	1	50			12	41	77	113	8	2
		Total	7	309	<1		59	382	511	859	56	11
	Pacific cod	Observed	724	191			2,315	253	2,941	25	218	<1
		Total	7,467	1,220	1,047		20,346	2,186	19,745	211	1,697	1
	Pollock	Observed	14	7			869	46	3	1	19,052	79
		Total	118	65	16	<1	9,096	329	33	8	127,847	548
	Rockfish	Observed	126	88			8,126	112		1	1,889	92
		Total	777	534	24		8,695	632	<1	11	2,143	476
	Sablefish	Observed	1,381	69			325	3		<1	1	<1
		Total	8,511	427			439	31		2	16	<1
	Shallow-water flats	Observed		1			542	39	<1	<1	6	
		Total	<1	13	<1		3,196	333	<1	2	118	<1
	Skates	Observed	65	414			84	46	<1	<1	2	<1
		Total	468	2,812	<1		666	223	<1	<1	16	1
	Sharks	Observed	<1	134			1	4		<1	1	19
		Total	<1	1,187			3	18		3	11	152

Table 4.5b. Total catch (retained and discard) of groundfish species and halibut (mt) caught in 2014 by catcher/processors (upper panel), and catcher vessels (lower panel) in the BSAI.

Sector	Species Caught	Trip Disposition	Hook and Line Retained	Hook and Line Discard	Jig Retained	Jig Discard	Non-Pelagic Trawl Retained	Non-Pelagic Trawl Discard	Pot Retained	Pot Discard	Pelagic Trawl Retained	Pelagic Trawl Discard
Catcher/ Processor	Atka Mackerel	Observed	<1	4			27,763	359		<1	2	5
		Total	<1	4			27,763	359		<1	2	5
	Flatfish	Observed	64	2,436			219,555	9,626	1	349	4,406	1,393
		Total	65	2,455			219,567	9,627	1	349	4,406	1,393
	Halibut	Observed		4,489				2,919		9		94
		Total		4,537				3,114		14		117
	Other groundfish	Observed	4	1,402			50	2,797	4	86	117	519
		Total	4	1,416			50	2,799	4	86	117	519
	Pacific cod	Observed	121,013	2,847			33,575	416	7,619		2,200	4
		Total	122,429	2,870			33,615	416	7,619		2,200	4
	Pollock	Observed	5,308	603			37,507	11,385	3	4	573,202	384
		Total	5,364	607			37,507	11,385	3	4	573,342	384
	Rockfish	Observed	87	110			31,578	489		<1	270	632
		Total	88	110			31,578	489		<1	270	632
	Sablefish	Observed	194	6			59	1				
		Total	196	6			59	1				
	Turbot	Observed	748	603			22,826	1,976		1	278	129
		Total	748	605			22,826	1,976		1	278	129
	Skates	Observed	6,482	15,073			1,264	2,448		<1	202	307
		Total	6,565	15,185			1,264	2,449		<1	202	307
	Sharks	Observed		53				4			<1	25
		Total		54				4			<1	25

Sector	Species Caught	Trip Disposition	Hook and Line		Jig		Non-Pelagic Trawl		Pot		Pelagic Trawl	
			Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard	Retained	Discard
Catcher Vessel	Atka Mackerel	Observed		<1				1	<1	1	95	1
		Total		<1			<1	2	<1	7	101	1
	Flatfish	Observed		1			10	365	<1	1	1,634	34
		Total	<1	17			14	512	<1	5	1,657	34
	Halibut	Observed	229	107				247		<1		59
		Total	1,749	956	2			332		30		62
	Other groundfish	Observed	<1	8			3	169	6	86	610	313
		Total	5	61			3	224	79	503	621	313
	Pacific cod	Observed	70	45			25,109	154	3,793	13	1,798	<1
		Total	2,166	246	2		34,074	190	27,274	145	1,856	<1
	Pollock	Observed		2			1,021	1,066	<1	1	546,628	74
		Total		9			1,392	1,391	2	7	555,444	74
	Rockfish	Observed	5	13				8	<1	<1	392	47
		Total	48	170	<1	<1	<1	18	1	5	409	50
	Sablefish	Observed	60	3					29		<1	
		Total	514	27					324		<1	
	Turbot	Observed	1	13			2	122		1	176	2
		Total	4	105			2	157	<1	8	182	2
	Skates	Observed		57			1	90		<1	147	41
		Total	3	903			1	118		<1	150	42
	Sharks	Observed		1				<1			4	36
		Total		3			<1	<1			4	37

Electronic monitoring

NMFS and the NPFMC have developed an Electronic Monitoring (EM) Strategic Plan to integrate video monitoring into the Observer Program. It is the intention of NMFS to initiate a program for the implementation of electronic monitoring of the Alaska fleets (including halibut and sablefish) to improve data collection. The NMFS Policy on Electronic Monitoring Technologies and Fishery Dependent Data Collection published in May 2013 provides guidance on the adoption of electronic technology solutions in fishery-dependent data collection programs. Electronic technologies include the use of vessel monitoring systems (VMS), electronic logbooks, video cameras for electronic monitoring (EM), and other technologies that provide EM and electronic reporting (ER). The policy also includes guidance on the funding for electronic technology use in fishery-dependent data collection programs.

The implementation of fisheries management regulations that require near real-time monitoring of catch by species at the vessel level have challenged the methodological and budgetary limits of data collection methods such as self-reporting, at-sea monitoring, and dockside monitoring. A policy and process to consider the adoption of electronic technology options may help ensure the agency's fishery-dependent data collection programs are cost-effective and sustainable.

The NPFMC, at its meeting in December 2014, reviewed its Electronic Monitoring Workgroup's progress in developing a cooperative research plan for 2015, and moving towards pre-implementation of EM in 2016. 2015 fieldwork will focus both on operational testing of EM camera systems in the under 58 ft longline fleet, as well as further research on all EM systems to evaluate whether they will successfully achieve the Council's goal to integrate EM used for catch estimation into the Observer Program. The Workgroup outlined a timeframe for how the fieldwork and pre-implementation years will intersect with the Council's analytical process and EM's eventual integration into the Annual Deployment Plan process. The Workgroup also reported on the budget and funding for the 2015 fieldwork, and opportunities for funding for the 2016 pre-implementation year.[52]

[52] North Pacific Fisheries Management Council News & Notes December 2014 http://www.npfmc.org/wp-content/PDFdocuments/newsletters/news1214.pdf

Ecosystem data collection

Ecosystem characteristics of BS and AI, and GOA are assessed annually in the Ecosystem Considerations appendix to the BSAI and GOA SAFE Evaluation report. Since 1995, this document has been prepared in order to provide information about effects of fishing from an ecosystem perspective, and the effects of environmental change on fish stocks. Since 1999, the section has included information on indicators of ecosystem status and trends, and more ecosystem-based management performance measures. The Ecosystem Consideration document and report cards were updated for 2014[53] (see clause 13). An analysis of the relationship between sablefish recruitment and sea temperature, Pink salmon productivity, and chlorophyll concentration was updated. Based on this model, predictions are for below average recruitment events for age-2 sablefish in 2013 and 2015, and a slightly above-average recruitment event is expected in 2014. As well, each SAFE report is required to include an ecosystem section related specifically to the species being assessed. The sablefish ecosystem information was updated for the 2014 SAFE report[54] (See clause 13 for more information).

Socio-economic data collection

The Economic and Social Sciences Research Program within NMFS's Resource Ecology and Fisheries Management (REFM) Division provides economic and socio-cultural information that assists NMFS in meeting its stewardship programs. Data is presented in an annual economic status report, most recently in 2014[55]. Fig. B4.3 shows the ex-vessel value of the groundfish catch in the commercial fisheries in the BSAI and GOA areas by major species for 2003-2013.

[53] http://www.afsc.noaa.gov/REFM/Docs/2014/ecosystem.pdf

[54] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. North Pacific Fishery Management Council, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424.

[55] Fissel, B, M. Dalton, R. Felthoven, B. Garber-Yonts, A. Haynie, A. Himes-Cornell, S. Kasperski, J. Lee, D. Lew, C. Seung. 2014. Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Island Area: Economic Status of the Groundfish Fisheries off Alaska, 2013. http://www.afsc.noaa.gov/refm/docs/2014/economic.pdf

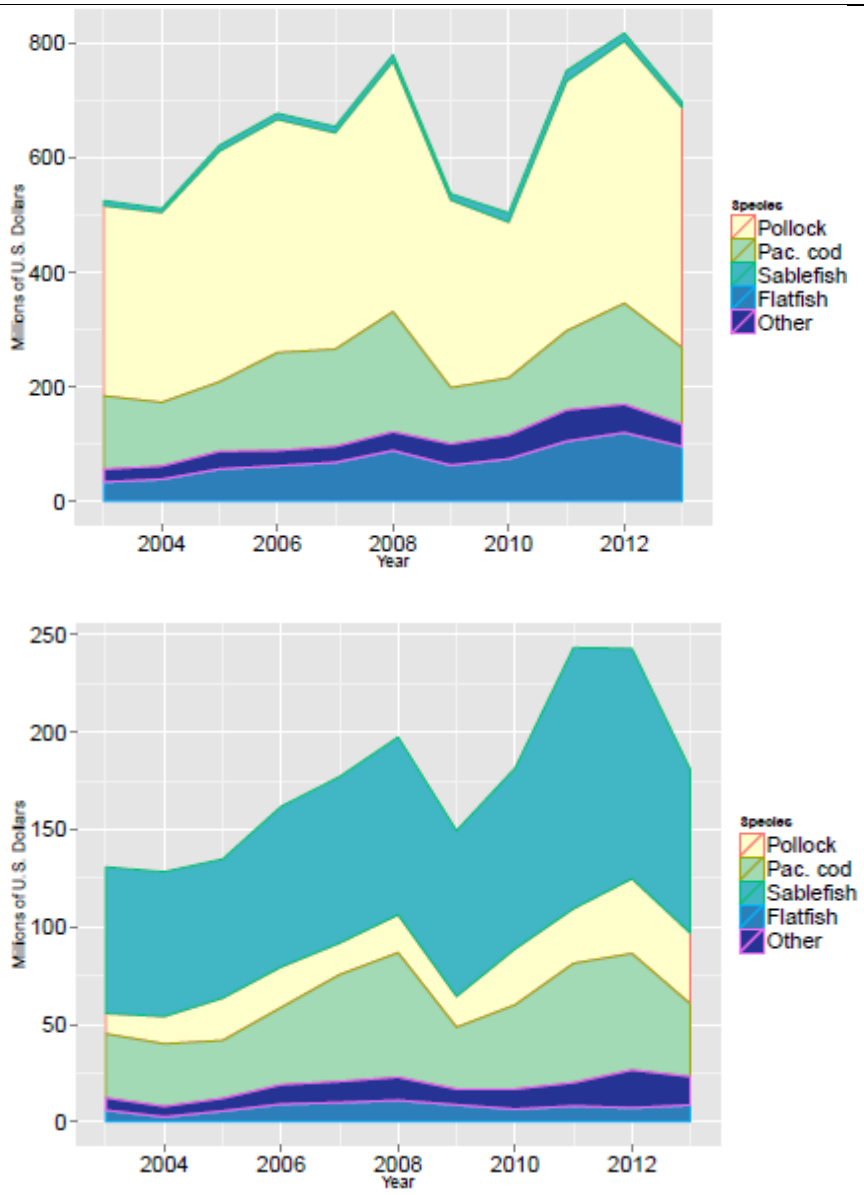


Fig. B4.3 Ex-vessel value of the groundfish catch in the commercial fisheries in the BSAI (upper) and GOA (lower) areas by species for 2003-2013.[56]

In 2005, the AFSC compiled baseline socioeconomic information about Alaskan fishing communities in the first edition of Community Profiles for North Pacific Fisheries. Between 2010 and 2011, AFSC went through the process of updating the profiles. A total of 196 communities have now been profiled[57]. The new profiles add a significant amount of new information to help provide a better understanding of each community's reliance on fishing. The profiles include

[56] Fissel, B, M. Dalton, R. Felthoven, B. Garber-Yonts, A. Haynie, A. Himes-Cornell, S. Kasperski, J. Lee, D. Lew, C. Seung. 2014. Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Island Area: Economic Status of the Groundfish Fisheries off Alaska, 2013.

[57] NOAA Fisheries Economic and Social Sciences Research Program http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php

information collected from communities in the Alaska Community Survey, which was conducted during summer 2011, and the Processor Profiles Survey, which was conducted in fall 2011.[58]

5. There shall be regular stock assessment activities appropriate for the fishery, its range, the species biology and the ecosystem, undertaken in accordance with acknowledged scientific standards to support its optimum utilization.

FAO CCRF 7.2.1/12.2/12.3/12.5/12.6/12.7/12.17

FAO Eco 29-29.3

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Rating determination

The mission of the NMFS/AFSC is to plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence. The sablefish population is assessed with a statistical, forward-projecting age-structured model which estimates population numbers and mortality rates separately for male and female sablefish. The results of the assessment are fully documented in the 2014 SAFE. Apart from new data, there are no model changes in 2014 relative to 2013. ADFG annual longline research surveys began in 1988 in both Northern southeast inside (NSEI) and Southern southeast inside (SSEI) subdistricts to assess the relative abundance of sablefish over time and differing environmental conditions. Mark-recapture studies for sablefish are also carried out in NSEI. The Cook Inlet fishery is managed using a Guideline Harvest Level (GHL) based on harvest history, fishery performance, and the federal survey for the area. The Aleutian Island fishery is set as 5% of the BSAI federal TAC. The Prince William Sound sablefish fishery is managed using a GHL and derived from the estimated area of sablefish habitat and a yield-per-unit-area model.

Research institutions and scientific capacity

Federal

With passage of the MSA in 1976, US federal jurisdiction occurs out to 200 miles. MSA sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent. Guided by these standards, and other legal requirements, the NMFS has a well-established institutional framework for research developed within the Alaska Fisheries Science Center (AFSC). The mission of the AFSC is to plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence. The AFSC operates several laboratories (e.g. Auke Bay Biological Lab and the National Marine Mammal Lab), and extensive fisheries monitoring and analysis section (Observers), the Resource Assessment & Conservation Engineering (RACE) and the Resource Ecology Fisheries & Management (REFM) Divisions.

[58] Himes-Cornell, A., C. Package, and A. Durland. 2011. Improving community profiles for the North Pacific fisheries. U.S. Dep. Commer.,NOAA Tech. Memo. NMFS-AFSC-230, 85 p. http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-230.pdf

Federal waters stock assessment model

Sablefish form two populations in the Alaska/BC and south areas: a northern population in Alaska and northern British Columbia waters and a southern population in southern British Columbia, Washington, Oregon, and California waters, with mixing of the two populations occurring off southwest Vancouver Island and northwest Washington. The stock assessment authors state that significant stock structure among the federal Alaska population is unlikely given extremely high movement rates throughout their lives.[59] Sablefish are assessed as a single population in Federal waters off Alaska because of these high movement rates, but are managed within six regions to distribute exploitation in the fishery throughout their wide range.

Table B4.1 in the previous section documents the data (including updates) used in the 2014 stock assessment. The model is unchanged from that used in the 2013 stock assessment, i.e. a statistical, forward-projecting age-structured model which estimates population numbers and mortality rates separately for male and female sablefish. The model is fitted using data on catches, length/age compositions and CPUE from the fisheries, and several series of abundance indices and associated age or length compositions from longline and trawl surveys. Much of the biological information for estimates of these factors comes from annual longline surveys, observer samples of the fishery, and fishery logbooks. Tagging results can be used as an independent check on these results, and average mortality estimates from time at liberty in various tagging experiments were similar to the stock assessment. The current assessment model configuration follows a more complex version of the GOA Pacific ocean perch model[60] with split sexes to attempt to more realistically represent the underlying population dynamics of sablefish. The current configuration was accepted by the Groundfish Plan Team and NPFMC in 2010. The analysis was completed using AD Model Builder software, a C++ based software for development and fitting of general nonlinear statistical models.

The authors compared a selection of parameter estimates (including survey catchabilities, spawning biomass estimates, F40%, and certain year-class sizes) from the Markov-Chain Monte Carlo (MCMC) simulations with the maximum-likelihood estimates (MLE), and compared each method's associated level of uncertainty. They also conducted a limited Bayesian analysis of assessment uncertainty around the same key parameters. Bayesian credible intervals were defined for these, and compared with the MCMC and MLE results. The thresholds examined for SSB were those defined in the NPFMC harvest rules, and include when the spawning biomass falls below B40%, B35%, and when the spawning biomass falls below ½ MSY or B17.5%. To examine the posterior probability, the SAFE authors projected spawning biomass into the future with recruitments varied as random draws from a lognormal distribution with the mean and standard deviation of 1979-2012 age-2 recruitments.[61]

[59] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. North Pacific Fishery Management Council, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424

[60] Hanselman, D.H., J. Heifetz, J.T. Fujioka, and J.N. Ianelli. 2005. Gulf of Alaska Pacific ocean perch. In Stock assessment and fishery evaluation report for the groundfish fisheries of the Gulf of Alaska. North Pacific Fishery Management Council, 605 W 4th Avenue, Suite 306, Anchorage, AK 99510. pp. 525-578. http://www.afsc.noaa.gov/refm/docs/2005/GOAPOP.pdf

[61] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. NPFMC, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424

Stock Assessment Results and Stock Status

Table B5.1 shows the 2014 assessment summary results. The fishery abundance index decreased 13% from 2012 to 2013 (the 2014 data are not available yet). The longline survey abundance index increased 15% from 2013 to 2014 following a 25% decrease from 2011 to 2013. Spawning biomass is projected to decrease from 2015 to 2018, and then stabilize. The maximum permissible ABC for 2015 from a Tier 3b adjusted F40% strategy is 13,657 t, which is the recommended level.[62] The maximum permissible ABC for 2015 is very similar to the 2014 ABC of 13,722 t. Apportionments among the NPFMC management areas were recommended to be unchanged for 2015.

Table B5.1. Summary of results from 2014 assessment of sablefish.[63]

	As estimated or specified *last* year for:		As estimated or recommended *this* year for:	
Quantity/Status	2014	2015	2015*	2016*
M (natural mortality rate)	0.10	0.10	0.10	0.10
Tier	3b	3b	3b	3b
Projected total (age 2+) biomass (t)	215,446	221,212	219,997	227,042
Projected female spawning biomass (t)	91,212	88,793	91,183	88,345
$B_{100\%}$	265,903	265,903	262,269	262,269
$B_{40\%}$	106,361	106,361	104,908	104,908
$B_{35\%}$	93,066	93,066	91,794	91,794
F_{OFL}	0.095	0.090	0.098	0.091
$maxF_{ABC}$	0.080	0.077	0.082	0.078
F_{ABC}	0.080	0.077	0.082	0.078
OFL (t)	16,225	14,667	16,128	14,658
max ABC (t)	13,722	12,400	13,657	12,406
ABC (t)	13,722	12,400	**13,657**	12,406
Status	As determined *last* year for:		As determined *this* year for:	
	2012	2013	2013	2014
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

* Projections are based on estimated catches of 11,172 t and 9,862 t used in place of maximum permissible ABC for 2015 and 2016. This was done in response to management requests for a more accurate two-year projection.

[62] Ibid.
[63] Ibid.

Plan team summaries

Area	Year	Biomass (4+)	OFL	ABC	TAC	Catch
GOA	2013	167,000	14,780	12,510	12,510	11,945
	2014	149,000	12,500	10,572	10,572	10,391
	2015	130,000	12,425	10,522		
	2016	127,000	11,293	9,558		
BS	2013	19,000	1,870	1,580	1,580	634
	2014	21,000	1,584	1,339	1,339	328
	2015	34,000	1,575	1,333		
	2016	33,000	1,431	1,211		
AI	2013	28,000	2,530	2,140	2,140	1,062
	2014	28,000	2,141	1,811	1,811	757
	2015	24,000	2,128	1,802		
	2016	23,000	1,934	1,637		

Year	2014				2015		2016	
Region	OFL	ABC	TAC	Catch*	OFL	ABC	OFL	ABC
BS	1,584	1,339	1,339	328	1,575	1,333	1,431	1,211
AI	2,141	1,811	1,811	757	2,128	1,802	1,934	1,637
GOA	12,500	10,572	10,572	10,391	12,425	10,522	11,293	9,558
W	--	1,480	1,480	1,090	--	1,474	--	1,338
C	--	4,681	4,681	4,737	--	4,658	--	4,232
**WYAK	--	1,574	1,574	1,707	--	1,708	--	1,552
SEO	--	2,837	2,837	2,857	--	2,682	--	2,436
Total	16,225	13,722	13,722	11,476	16,128	13,657	14,658	12,406

*Extrapolated from October 1, 2014 Alaska Fisheries Information Network, (www.akfin.org). **After 95:5 trawl split shown above.

Model evaluation.

The stock assessment authors state that there were no changes to the 2014 model from that used in 2013, other than inclusion of updated data. The following table shows some key comparisons between the 2013 and 2014 models.[64]

[64] Ibid.

Model Likelihood Components (Data)	2013	2014
Catch	8	7
Domestic LL survey RPN	46	47
Japanese LL survey RPN	18	18
Domestic LL fishery RPW	7	10
Japanese LL fishery RPW	12	13
NMFS GOA trawl survey	19	19
Domestic LL survey ages	169	180
Domestic LL fishery ages	192	238
Domestic LL survey lengths	55	59
Japanese LL survey ages	144	144
Japanese LL survey lengths	46	46
NMFS trawl survey lengths	290	286
Domestic LL fishery lengths	198	207
Domestic trawl fishery lengths	186	194
Data likelihood	1391	1469
Total objective function value	1415	1489
Key parameters		
Number of parameters	216	219
$B_{next\ year}$ (Female spawning (kt) biomass for next year)	91	92
$B_{40\%}$ (Female spawning biomass (kt))	106	105
B_{1960} (Female spawning biomass (kt))	161	161
$B_{0\%}$ (Female spawning biomass (kt))	266	262
$SPR\%$ current	34.3%	35.1%
$F_{40\%}$	0.094	0.094
$F_{40\%}$ (Tier 3b adjusted)	0.080	0.082
ABC(kt)	13.7	13.7
$q_{Domestic\ LL\ survey}$	7.7	7.6
$q_{Japanese\ LL\ survey}$	6.3	6.2
$q_{Domestic\ LL\ fishery}$	4.1	4.0
$q_{Trawl\ Survey}$	1.4	1.3
$a_{50\%}$ (domestic LL survey selectivity)	3.8	3.8
$a_{50\%}$ (LL fishery selectivity)	3.9	3.9
μ_r (average recruitment)	17.8	18.0
σ_r (recruitment variability)	1.20	1.20

The 2014 update shows a slight increase in spawning and total biomass from previous projections. The model generally fit the data well, as most abundance indices generally tracked through the middle of the confidence intervals of the estimates. It was concluded that the 2014 model is utilizing the new information effectively, and it was therefore used to recommend the 2015 ABC and OFL.[65]

Brief summary of time trends from the model

Spawning biomass increased from a low of 32% of unfished biomass in 2002 to 35% of unfished biomass projected for 2015 but is trending downward in projections for the near future. Annual estimated recruitment varies widely; the two recent strong year classes in 1997 and 2000 are evident in all data sources. After 2000, few strong year classes are apparent, but the 2008 year

[65] Ibid.

class is currently estimated to be the largest since 2000. Recent management has generally constrained fishing mortality below the limit rate, and until recently kept the stock above the B35% limit. Projected 2015 and 2016 spawning biomass is slightly below B35%.[66]

Retrospective Analysis

For the 2014 assessment, scientists showed the retrospective trend in spawning biomass and total biomass for ten previous assessment years (2004-2013) compared to estimates from the current preferred model. In recent years, the retrospective plot of spawning biomass shows only small changes from year to year. Recruitment estimates appear to have little trend over time with the exception of the 2002 year class which increased from a very low value to near average. One common measure indicates the retrospective is very low relative to most assessments at the AFSC[67]. This decline from the 2013 assessment was attributed to two factors: 1) 2003, which had a relatively large change from the terminal year, was dropped from the retrospective window; and 2) The update of catch data in 2014 added a significant amount of catch in the early part of the retrospective window, which increased the estimate of spawning biomass at the recent low point.

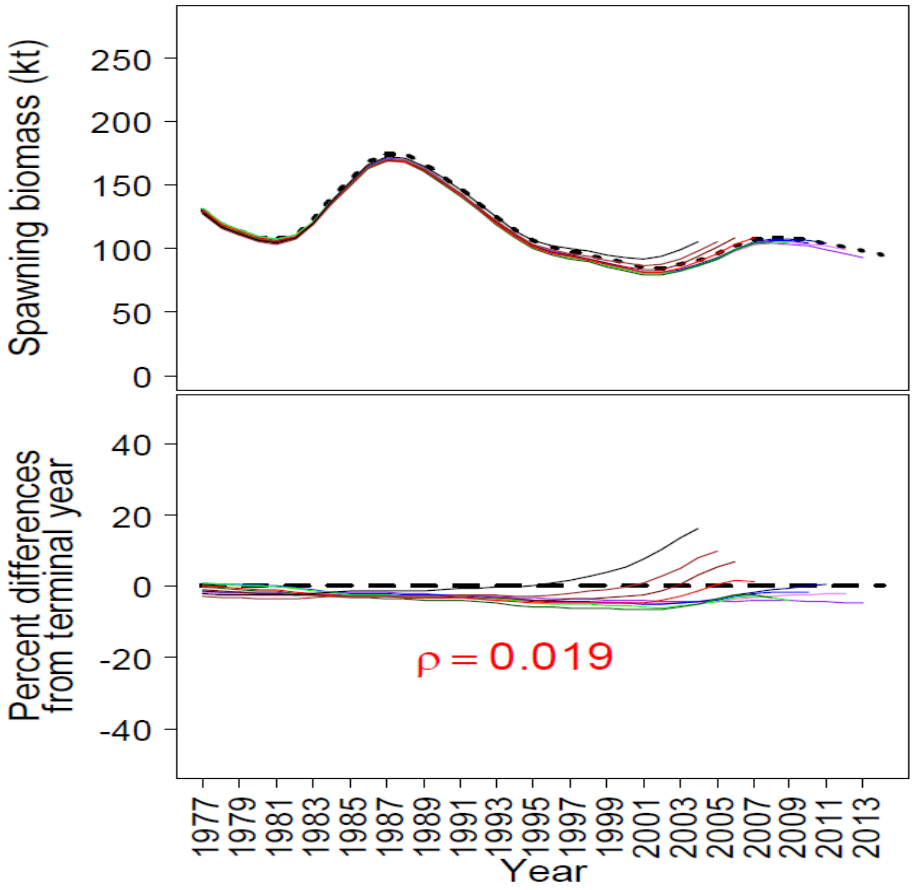


Fig. B5.1. Retrospective trends for spawning biomass (top) and percent difference from terminal year (bottom) from 2004-2014.[68]

Total catch accounting

To better determine amounts of total catch from all fisheries, stock assessment authors provide estimates of "other removals" that include non-commercial harvest and the incidental take in the halibut fishery. These estimates represent additional sources of removals to the existing Catch

[66] Ibid.
[67] Ibid.
[68] Ibid.

Accounting System estimates. They include new datasets for non-commercial harvest and incidental catch in the halibut fishery. Total removals from activities other than directed fishery have been between 239 and 359 t in recent years. These catches are not included in the stock assessment model, but equate to approximately 2% of the recommended ABC and therefore represent a relatively low risk to the sablefish stock. For the halibut fishery, HFICE estimates should be considered preliminary estimates for what is caught in the IFQ halibut fishery. Improved estimates of groundfish catch in the halibut fishery are now available following restructuring of the Observer Program. The Halibut Fishery Incidental Catch Estimation (HFICE) provides estimates of sablefish catch by the halibut fishery. These are substantial and represent approximately 10% of the annual sablefish ABC. Due to possible double counting of some catches, the HFICE estimates cannot simply be added to the catch reported from CAS. The HFICE estimates may represent some valuable discard information for sablefish, but that level is unknown until these estimates are separated from the IFQ landings and CAS system. (See Appendix 3B is 2014 SAFE.[69]) The authors conclude that if these were strictly additive removals, 10% would represent a significant amount of additional mortality and a potential risk to the stock, but how much is additive is unknown.

Research applicable to stock assessment

There are several completed and ongoing sablefish research projects related to stock assessment, with details found in Appendix 3 of 2014 SAFE.[70] New modeling results for estimating the effects of whale depredation are available, and a number of sensitivity model scenarios were conducted that incorporated some of the results of this research. Although the scientists involved believe they have determined a useful correction (for the longline survey indices) for depredation by sperm whales, and possibly killer whales, further work is required to determine if and how to use these corrected indices in the assessment. A postdoctoral researcher started in December 2014 to aid in this project, and a more detailed document addressing modeling of sperm whale and killer whale depredation and application to the sablefish stock assessment is forthcoming. Other relevant research includes work on survey areas (e.g. not surveyed annually), maturity of sablefish (publication in process), and a study of sablefish movement and mortality, based on various tagging programs carried out mainly by AFSC.[71] The results of these studies will be relevant to future stock assessments when completed. In particular, it is anticipated that the latter study will help in estimating age-specific movement of sablefish, and be useful for conducting management strategy evaluation of spatial stock assessment models.[72]

Other recent work has examined the relationship between environment and sablefish year class strengths at age 2 in a given year. The stock assessment uses age 2 sablefish as a recruitment index. The large year classes of sablefish indicate that the population, though low, still was able to take advantage of favorable environmental conditions and produce large year classes. Shotwell et al. (2014)[73] examined relevant monthly sea surface temperatures that affect year class strengths and included them directly into an assessment model. The best model suggested that colder than

[69] Ibid.
[70] Ibid
[71] Hanselman, D.H., J. Heifetz, K.B. Echave, and S.C. Dressel. 2015. Move it or lose it: movement and mortality of sablefish tagged in Alaska. Can. J. Fish and Aquat Sci., 2015, 72:238-251, 10.1139/cjfas-2014-0251.
[72] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. NPFMC, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424
[73] Shotwell, S.K., Hanselman, D.H., and Belkin, I.M. 2014. Toward biophysical synergy: investigating advection along the Polar Front to identify factors influencing Alaska sablefish recruitment. Deep-Sea Res. II Top. Stud. Oceanogr. 107: 40–53. http://www.researchgate.net/publication/267761356_Toward_biophysical_synergy_Investigating_advection_along_the_Polar_Front_to_identify_factors_influencing_Alaska_sablefish_recruitment

average wintertime sea surface temperatures in the central North Pacific represent oceanic conditions that create positive recruitment events for sablefish.[74] The incorporation of this index in a sablefish model provided moderate reduction in unexplained recruitment variability and increased future projections of spawning biomass in the medium term. Based on this result, the authors of the study developed a conceptual model of three mechanisms, which influence sablefish survival through the pelagic early life history (young of the year) stage. Regional indices such as chlorophyll-a, sea surface height, and freshwater discharge may also be related to sablefish recruitment[75].

Future planned research

Although there has been much recent research progress on sablefish stock assessment, the SAFE authors note that several major challenges remain. These include estimating and accounting for effects of whale depredation on indices from the survey and the fishery, evaluating the current apportionment strategies, developing a spatial research model of sablefish that includes movement, and determining the ecological basis of year class strength. There is ongoing or planned research for each of these. A sablefish CIE review scheduled for 2016 will provide expert opinion on the results of these research projects and provide advice to help integrate the findings into the sablefish stock assessment. The goal will then be to incorporate this work into the assessment model and produce a benchmark assessment.[76]

State fisheries stock assessment

For state-managed fisheries, ADFG has a well-developed research capacity. The state's Policy and Planning Committee establish research priorities. In state waters, ADFG manages five sablefish fisheries outside the IFQ program. Three major state fisheries exist which are limited entry and are located in Prince William Sound (PWS), Northern Southeast Inside (NSEI, or Chatham Strait) and Southern Southeast Inside (SSEI, or Clarence Strait). The Cook Inlet and Aleutian Islands fishery are smaller fisheries than the other three. The Cook Inlet, Prince William Sound and the Aleutian Islands state fisheries are managed using NMFS assessment data, historical catches and effort, projected catch and effort, and a yield-per-unit-area model, among other parameters.

Southeast Alaska (NSEI, SSEI)

In 2014, sablefish longline surveys were conducted for both the NSEI and SSEI areas. These surveys are designed to measure trends in relative abundance and biological characteristics of the sablefish population. Since 2012, ADF&G has conducted a mark/recapture study in NSEI, which provides estimates of abundance and exploitation rates, and is the basis of the NSEI stock assessment. No pot tagging survey occurred in 2014 due to budget reductions; however, a survey is scheduled for May 2015.[77] The 2013 point estimate of abundance was used to forecast abundance and biomass for the 2015 fishery using updated biological data from the fishery and survey. As in previous years, an F50% biological reference point was used for calculating the 2015 ABC, resulting in a harvest rate of 7.1% (the harvest rate in 2014 was 6.9%). The 2015 ABC (986,481 round pounds) increased 4% relative to the 2014 ABC (952,538 round pounds). The

[74] Ibid.
[75] Ibid.
[76] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. NPFMC, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424
[77] ALASKA DEPARTMENT OF FISH AND GAME DIVISION of COMMERCIAL FISHERIES & DIVISION of SPORT FISH April 2015 STATE OF ALASKA GROUNDFISH FISHERIES ASSOCIATED INVESTIGATIONS IN 2014 http://www.psmfc.org/tsc-drafts/2015/2014_AK_TSC_ALaska_draftfinal.pdf

modest increase in the ABC is based primarily on a slight increase in fishery and survey weight-at-age and harvest rate.[78]

In SSEI, only an annual longline survey is conducted to provide biological data as well as relative abundance information. Unlike in NSEI, ADFG does not currently estimate the absolute abundance of SSEI sablefish. There appears to be substantial movement of sablefish in and out of the SSEI area, which violates the assumption of a closed population; consequently, Peterson mark-recapture estimates of abundance or exploitation rates are not possible for this fishery. Instead, the SSEI sablefish population is managed based on relative abundance trends from survey and fishery CPUE data, as well as with survey and fishery biological data that are used to describe the age and size structure of the population and detect recruitment events. The 2015 SSEI sablefish commercial annual harvest objective (AHO) is 536,618 round lb, no change from the 2014 AHO. Slight declines were observed in the SSEI longline survey CPUE (8%) and the SSEI commercial longline fishery (9%) between 2013 and 2014. A reduction in the high proportion of immature fish in the longline survey and fishery was also observed, but the 2014 proportion of immature fish still remains above the long-term average.[79]

Cook Inlet

The fishery GHL is adjusted each year in proportion to the annual percentage change in the Central Gulf of Alaska (CGOA) ABC for sablefish set by the NPFMC for federal waters of the CGOA. The ABC is based on biomass estimates generated from annual surveys conducted by NMFS in the GOA. In the latest survey conducted in 2014, biomass estimates decreased by 0.5% and therefore the 2015 GHL for the Cook Inlet Management Area has also decreased by 0.5% from the 2014 GHL of 56,000 lb.[80]

Prince William Sound

Tagging studies conducted by NMFS and ADFG indicate that sablefish populations throughout the Gulf of Alaska (GOA) including the PWS area are likely mixed. Therefore, the GHL was adjusted by applying the relative change each year in the NMFS GOA sablefish ABC, which is derived from NMFS stock assessment surveys. The 2015 Prince William Sound GHL for sablefish is 122,000 lb. This is a reduction of approximately 50% from the 2014 GHL, and is in response to declining trends in fishery CPUE and harvest. The actual harvest in 2014 was 96,726 lb.[81]

Aleutian Islands

The GHL for the Aleutian Islands is set at 5% of the combined Bering Sea Aleutian Islands TAC. The state GHL can be adjusted according to recent state-waters harvest history when necessary.[82] The

[78] ALASKA DEPARTMENT OF FISH AND GAME DIVISION OF COMMERCIAL FISHERIES NEWS RELEASE 2015 NORTHERN SOUTHEAST INSIDE (NSEI) SABLEFISH FISHERY ANNUAL HARVEST OBJECTIVE ANNOUNCEMENT http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/541935269.pdf

[79] ALASKA DEPARTMENT OF FISH AND GAME DIVISION OF COMMERCIAL FISHERIES NEWS RELEASE 2015 SOUTHERN SOUTHEAST INSIDE SUBDISTRICT SABLEFISH FISHERY ANNOUNCEMENT http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/520501887.pdf

[80] ALASKA DEPARTMENT OF FISH AND GAME DIVISION OF COMMERCIAL FISHERIES NEWS RELEASE FISHERY ANNOUNCEMENT COOK INLET AREA SABLEFISH FISHERY OPENS EO # 2-GF-H-07-15 http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/543590401.pdf

[81] ALASKA DEPARTMENT OF FISH AND GAME DIVISION OF COMMERCIAL FISHERIES NEWS RELEASE PRINCE WILLIAM SOUND COMMERCIAL SABLEFISH FISHERY UPDATE SEASON OPENING AND QUOTA ALLOCATIONS http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/521863936.pdf

[82] ALASKA DEPARTMENT OF FISH AND GAME DIVISION of COMMERCIAL FISHERIES & DIVISION of SPORT FISH April 2015 STATE OF ALASKA GROUNDFISH FISHERIES ASSOCIATED INVESTIGATIONS IN 2014 http://www.psmfc.org/tsc-drafts/2015/2014_AK_TSC_ALaska_draftfinal.pdf

2015 Aleutian Islands state-waters sablefish fishery GHL is 346,000 pounds[83], 1,000 pounds less than the 2014 GHL.

C. The Precautionary Approach

6. The current state of the stock shall be defined in relation to reference points or relevant proxies or verifiable substitutes allowing for effective management objectives and targets. Remedial actions shall be available and taken where reference point or other suitable proxies are approached or exceeded.

FAO CCRF 7.5.2/7.5.3
Eco 29.2/29.2bis/30-30.2

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Rating determination

No significant change has occurred since the previous surveillance assessment in 2014. The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The Tier system specifies the maximum permissible Allowable Biological Catch (ABC) and of the Overfishing Limit (OFL) for each stock in the complex (usually individual species but sometimes species groups). The sablefish stock in Alaska is managed under Tier 3. For these stocks, the spawner-recruit relationship is uncertain, so that MSY cannot be estimated with confidence. Hence, a surrogate based on F40% is used, following findings in the scientific literature in the 1990s. For Tier 3 stocks, the MSY proxy level is defined as B35%. The MSST limit reference point is ½ MSY or B17.5%. The probability that next year's spawning biomass was below B35% was 0.89. During the next three years, the probability of falling below B17.5% is near zero, the probability of falling below B35% is 0.97, and the probability of staying below B40% is near 100%. In NPFMC settings, thresholds are defined in the Council harvest rules. These are when the spawning biomass falls below MSY or B35% and when the spawning biomass falls below ½ MSY=MSST or B17.5% which calls for a rebuilding plan under the MSA. The harvest control rule applied to sablefish is recognized as being effective at maintaining the stock at a biomass capable of producing maximum sustainable yield. When stock size falls below a target, the harvest rate is reduced to promote rebuilding to the target. The current biomass of sablefish is estimated to be below the B40% target, and consequently the TAC for the next year will be determined by the rule in Tier 3b, e.g. the harvest rate will be below the maximum allowed. Based on the 2014 SAFE, and the National Standard Guideline definitions, the stock is not subject to overfishing, overfished, or approaching an overfished condition. One of the five state-managed stocks (NSEI) uses an F-based reference point in setting catch levels, and 3 of the 4 others use GHLs tied to the ABCs set in federal waters.

[83] ALASKA DEPARTMENT OF FISH AND GAME DIVISION OF COMMERCIAL FISHERIES NEWS RELEASE ALEUTIAN ISLANDS STATE-WATERS SABLEFISH 2015 GUIDELINE HARVEST LEVEL AND SEASON OPENING ANNOUNCED http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/515949894.pdf

The Tier System

The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The Tier system specifies the maximum permissible Allowable Biological Catch (ABC) and the Overfishing Level (OFL) for each stock in the complex (usually individual species but sometimes species groups). NPFMC inaugurated the Tier system in fisheries management. In this system, the harvest control rule depends on the amount of information available. In Tier 1, information is abundant enough and compelling enough to determine the statistical distribution of maximum sustainable yield. Most of the larger and commercially important stocks under NPFMC management are in Tier 3, which has sufficient information to determine F40% and its corresponding biomass B40%. The tier definitions are as follows:[84]

Tier 1 Information available: reliable point estimates of B and B_{MSY} and reliable pdf of F_{MSY}.

1a) Stock status: $B/B_{MSY} > 1$
$F_{OFL} = mA$, the arithmetic mean of the pdf

1b) Stock status: $\alpha < B/B_{MSY} \leq 1$
$F_{OFL} = mA \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

1c) Stock status: $B/B_{MSY} \leq \alpha$
$F_{OFL} = 0$

Tier 2 Information available: reliable point estimates of B, B_{MSY}, F_{MSY}, $F_{35\%}$, and $F_{40\%}$.

2a) Stock status: $B/B_{MSY} > 1$
$F_{OFL} = F_{MSY}$

2b) Stock status: $\alpha < B/B_{MSY} \leq 1$
$F_{OFL} = F_{MSY} \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

2c) Stock status: $B/B_{MSY} \leq \alpha$
$F_{OFL} = 0$

Tier 3 Information available: reliable point estimates of B, $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.

3a) Stock status: $B/B_{40\%} > 1$
$F_{OFL} = F_{35\%}$

3b) Stock status: $\alpha < B/B_{40\%} \leq 1$
$F_{OFL} = F_{35\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$

3c) Stock status: $B/B_{40\%} \leq \alpha$
$F_{OFL} = 0$

Tier 4 Information available: reliable point estimates of B, $F_{35\%}$, and $F_{40\%}$.
$F_{OFL} = F_{35\%}$

Tier 5 Information available: reliable point estimates of B and natural mortality rate M.
$F_{OFL} = M$

Tier 6 Information available: reliable catch history from 1978 through 1995.
OFL = the average catch from 1978 through 1995, unless an alternative value is established by the SSC on the basis of the best available scientific information

Harvest control rule

The sablefish stock in Alaska is managed under Tier 3. For these stocks, the spawner-recruit relationship is uncertain, so MSY cannot be estimated with confidence. Hence, a surrogate based on F40% is used, following findings in the scientific literature in the 1990s. In Tiers 1–3, sufficient information is available to determine a target biomass level, which would be obtained at equilibrium when fishing according to the control rule with recruitment at the average historical level. The control rule is a biomass-based rule, for which fishing mortality is constant when biomass is above the target and declines linearly down to a threshold value when biomass drops below the target.

[84] Fishery Management Plan for Groundfish of the Gulf of Alaska. 2015. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501
http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf

Sablefish reference points

Sablefish are managed under Tier 3 of NPFMC harvest rules. Reference points are calculated using age 2 recruitment estimates from 1979-2012. The updated point estimates of B40%, F40%, and F35% from this assessment are 104,908 t (combined across the EBS, AI, and GOA), 0.095, and 0.112, respectively. Projected female spawning biomass (combined areas) for 2015 is 91,183 t (88% of B40%), placing sablefish in sub-tier "b" of Tier 3. The maximum permissible value of FABC under Tier 3b is 0.082, which translates into a 2015 ABC (combined areas) of 13,657 t. The OFL fishing mortality rate is 0.098 which translates into a 2015 OFL (combined areas) of 16,128 t.[85]

The SAFE authors estimated the probability that projected abundance will fall, or stay below thresholds of 17.5% (MSST), and 35% (MSY), and 40% (Btarget) of the unfished spawning biomass. The probability that spawning biomass falls below key biological reference points was estimated based on the posterior probability distribution for spawning biomass. The probability that next year's spawning biomass was below B35% was 0.89. During the next three years, the probability of falling below B17.5% is near zero, the probability of falling below B35% is 0.97, and the probability of staying below B40% is near 100% (Fig. C6.1).

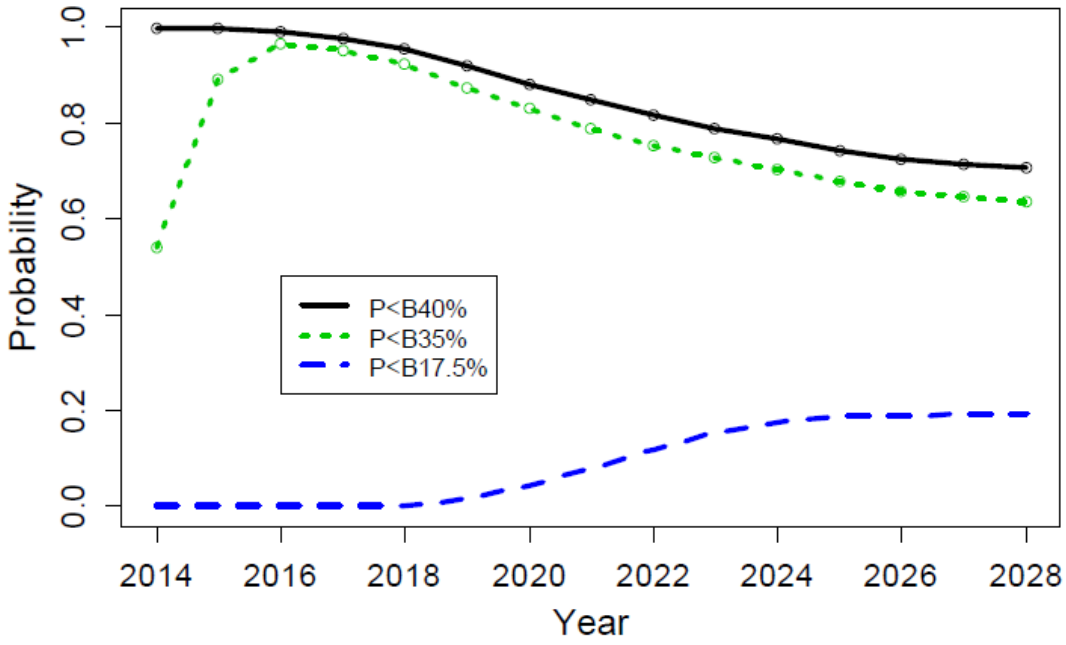


Fig. C6.1. Probability that projected spawning biomass will fall below B40%, B35% and B17.5%.[86]

Model projections conducted by the SAFE authors for a variety of harvest strategies (Table C6.1) indicate that this stock is not subject to overfishing, overfished, nor approaching an overfished condition, based on the National Standard Guideline definitions.

Table C6.1. Sablefish spawning biomass (kilotons), fishing mortality, and yield (kilotons) for seven

[85] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. NPFMC, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424

[86] Ibid.

harvest scenarios. Abundance projected using 1979-2012 (age 2) recruitments.[87]

Year	Maximum permissible F	Author's F* (specified catch)	Half max. F	5-year average F	No fishing	Overfished?	Approaching overfished?
			Spawning biomass (kt)				
2014	94.9	94.9	94.9	94.9	94.9	94.9	94.9
2015	92.2	92.2	92.1	92.2	92.2	92.2	92.2
2016	87.1	88.3	90.3	88.4	94.0	85.8	87.1
2017	82.5	84.9	87.8	84.7	95.6	80.4	82.5
2018	80.1	82.1	85.6	82.6	98.4	77.3	79.1
2019	80.6	82.3	84.7	83.4	104.0	77.3	78.8
2020	83.4	84.8	85.5	86.5	112.4	79.6	80.7
2021	87.2	88.3	88.3	90.8	122.3	82.8	83.7
2022	91.1	92.0	91.9	95.5	132.7	86.1	86.8
2023	94.7	95.4	95.9	100.0	143.1	89.1	89.6
2024	97.9	98.4	101.4	104.2	153.1	91.7	92.1
2025	100.6	101.0	106.4	107.9	162.5	93.9	94.2
2026	103.0	103.3	109.8	111.4	171.5	95.7	96.0
2027	105.1	105.3	113.9	114.5	179.9	97.3	97.5
			Fishing mortality				
2014	0.064	0.064	0.064	0.064	0.064	0.064	0.064
2015	0.082	0.067	0.041	0.066	-	0.098	0.098
2016	0.078	0.062	0.040	0.066	-	0.091	0.091
2017	0.073	0.075	0.039	0.066	-	0.085	0.085
2018	0.071	0.073	0.038	0.066	-	0.081	0.081
2019	0.070	0.072	0.038	0.066	-	0.080	0.080
2020	0.071	0.072	0.038	0.066	-	0.081	0.081
2021	0.072	0.072	0.039	0.066	-	0.082	0.082
2022	0.073	0.073	0.041	0.066	-	0.083	0.083
2023	0.074	0.074	0.043	0.066	-	0.084	0.084
2024	0.075	0.075	0.046	0.066	-	0.085	0.085
2025	0.076	0.076	0.047	0.066	-	0.087	0.087
2026	0.077	0.078	0.047	0.066	-	0.088	0.088
2027	0.079	0.079	0.047	0.066	-	0.090	0.090
			Yield (kt)				
2014	11.4	11.4	11.4	11.4	11.4	11.4	11.4
2015	13.7	13.7	7.0	11.0	-	16.1	13.7
2016	12.1	12.4	6.6	10.5	-	13.8	12.1
2017	11.7	12.3	6.8	10.7	-	13.1	13.8
2018	12.3	12.8	7.4	11.4	-	13.6	14.2
2019	13.3	13.7	8.1	12.2	-	14.7	15.1
2020	14.3	14.6	8.9	12.9	-	15.7	16.0
2021	15.3	15.5	9.5	13.5	-	16.8	17.0
2022	16.1	16.2	10.1	14.1	-	17.6	17.8
2023	16.8	16.9	10.7	14.6	-	18.4	18.5
2024	17.5	17.6	11.2	15.0	-	19.0	19.1
2025	18.0	18.1	11.7	15.4	-	19.6	19.7
2026	18.5	18.6	12.1	15.8	-	20.1	20.2
2027	19.1	19.1	12.5	16.1	-	20.7	20.7

* Projections in Author's F (Alternative 2) are based on estimated catches of 11,172 t and 9,862 t used in place of maximum permissible ABC for 2015 and 2016. This was done in response to management requests for a more accurate two-year projection.

[87] Ibid

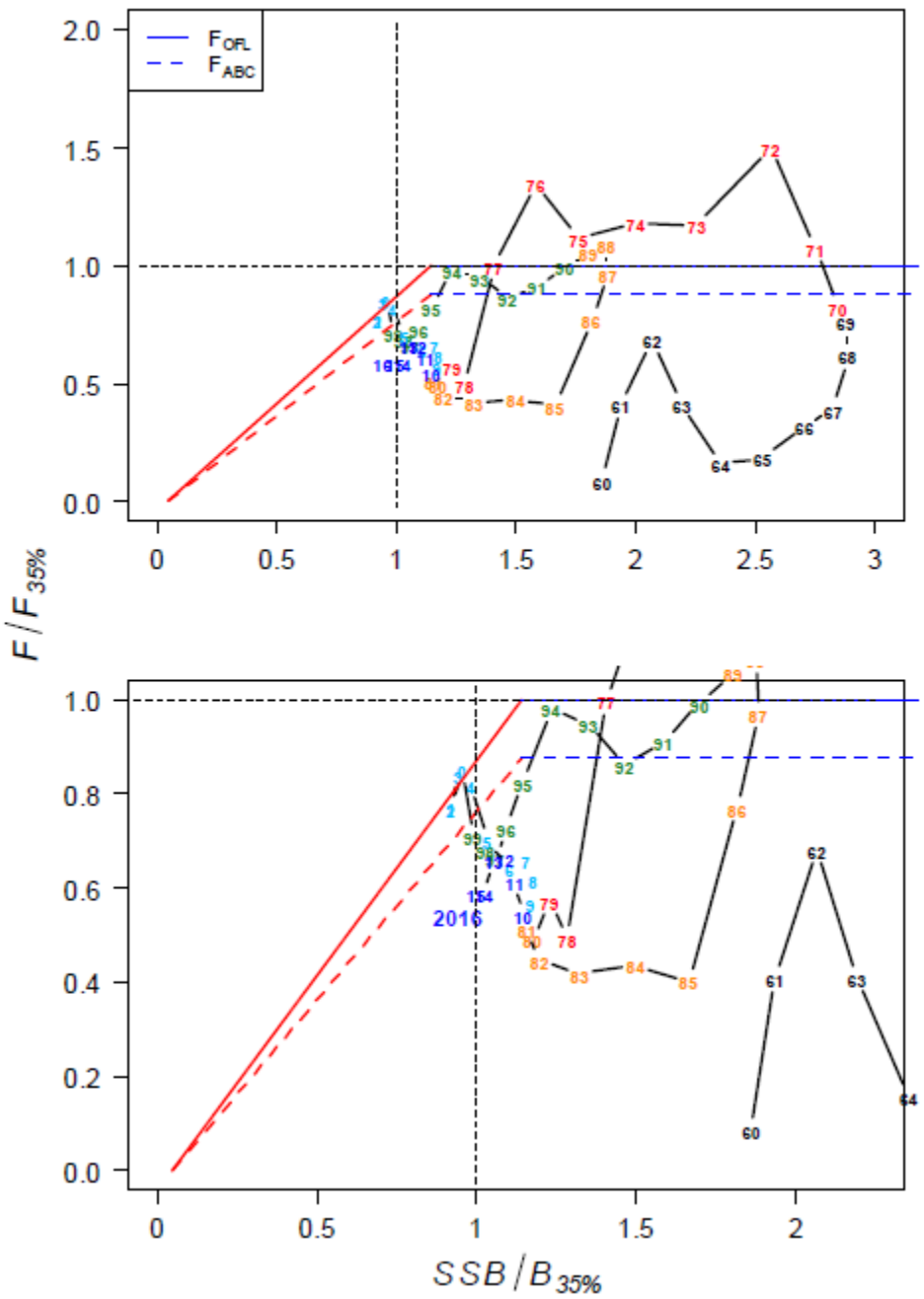


Fig. C6.2. Phase-plane diagram of time series of sablefish estimated spawning biomass relative to the unfished level and fishing mortality relative to FOFL for author recommended model. Bottom panel is zoomed in to examine more recent years.[88]

2015 Acceptable Biological Catch

The recommended ABC for 2015 from the 2014 SAFE was 13,657 t, which is very similar to the 2014 ABC of 13,722 t. This small decrease is supported by a moderate increase in the domestic longline survey index from the all-time low in 2013 that offset the lowest value of the fishery abundance index seen in 2013.[89]

[88] Ibid.
[89] Ibid.

Spawning biomass

Spawning biomass has increased from a low of 32% of unfished biomass in 2002 to 35% of unfished biomass projected for 2015 but is trending downward in projections for the near future. The 1997 year class has been an important contributor to the population; however, it has been reduced and is predicted to comprise less than 7% of the 2015 spawning biomass. The 2000 year class is still the largest contributor, with 16% of the spawning biomass in 2015. The 2008 year class is average and will comprise 10% of spawning biomass in 2015 even though it is only 60% mature. Spawning biomass is projected to decline through 2018 (Table C6.1, Figure C6.3), and then is expected to increase, assuming average recruitment is achieved in the future.[90]

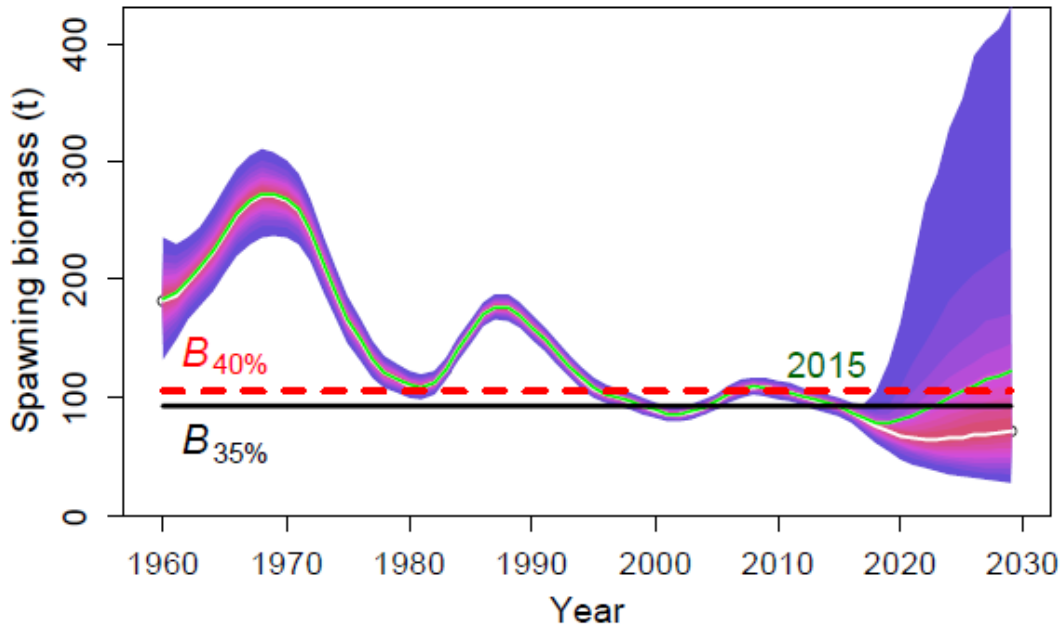


Fig. C6.3. Estimates of female spawning biomass (thousands t) and their uncertainty. White line is the median and green line is the mean, shaded fills are 5% increments of the posterior probability distribution of spawning biomass based on 10,000,000 MCMC simulations. Width of shaded area is the 95% credibility interval. Harvest policy is the same as the projections in Scenario 2 in Table C6.1 above.[91]

State Fisheries

In state waters, ADFG manages five sablefish fisheries outside the IFQ program. Three major state fisheries exist which are limited entry and are located in Prince William Sound (PWS), Northern Southeast Inside (NSEI) (or Chatham Strait) and Southern Southeast Inside (SSEI) (or Clarence Strait), and two smaller fisheries, the Cook inlet and Aleutian Islands fishery. The Cook Inlet, Prince William Sound and the Aleutian Islands state fisheries have harvest limits (GHL) and are managed using NMFS assessment data (and therefore federal reference points), historical catches and effort, projected catch and effort, and a yield-per-unit-area model, among other parameters. For Cook Inlet and Aleutian Islands, the 2015 GHLs were almost identical to the 2014 levels, while the PWS GHL was reduced by 50% in 2015.

[90] Ibid.
[91] Ibid.

For the NSEI area, the 2013 point estimate of abundance was used to forecast abundance and biomass for the 2015 fishery using updated biological data from the fishery and survey. As in previous years, an F50% biological reference point was used for calculating the 2015 ABC, resulting in a harvest rate of 7.1%. The 2015 ABC (986,481 round pounds) increased 4% relative to the 2014 ABC (952,538 round pounds). The modest increase in the ABC is based primarily on a slight increase in fishery and survey weight-at-age and harvest rate.[92] The SSEI sablefish population is managed based on relative abundance trends from survey and fishery CPUE data, as well as with survey and fishery biological data that are used to describe the age and size structure of the population and detect recruitment events. The 2015 SSEI sablefish commercial annual harvest objective (AHO) is 536,618 round lb, no change from the 2014 AHO.

Details for the state-managed fisheries have been provided under the previous fundamental clause (No. 5). Although there are no reference points for most, the state fisheries appear to be well managed, with recent catches often being less than the specified GHLs.

7. Management actions and measures for the conservation of stock and the aquatic environment shall be based on the Precautionary Approach. Where information is deficient a suitable method using risk assessment shall be adopted to take into account uncertainty.

FAO CCRF 7.5.1/7.5.4/7.5.5

FAO ECO 29.6/32

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Rating determination

No significant change has occurred since the previous surveillance assessment in 2014. The first element of the precautionary approach is the Optimum Yield (OY) for the groundfish complexes in the Bering Sea / Aleutian Islands (BSAI) and the GOA as a range of numbers. The sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within the range. The second element of precautionary approach is the Tier system, based on knowledge and uncertainties of the stock in question. NPFMC inaugurated the Tier system in fisheries management: the harvest control rule depends on the amount of information available. The less the information about a given stock, the more conservative is the catch allowed. The third element of the precautionary approach is the ACL, OFL, ABC and TAC system. Allowable Biological Catch (ABC) is a scientifically acceptable level of harvest based on the biological characteristics of the stock and its current biomass level. Overfishing Limit (OFL) is a limiting catch level, corresponding to fishing at MSY level, higher than ABC, which demarcates the boundary beyond which the fishery is no longer viewed as sustainable. In application, the NPFMC sets TAC ≤ ABC < OFL. Bycatch from a given stock is limited by a Maximum Retainable Amount (MRA), which is determined as a percentage of retained catch. Alternatively, Prohibited Species Catches (PSC) limits close fisheries when reached.

Optimum Yield

The first element of the precautionary approach for Alaskan groundfish stocks under NPFMC management[93] is the Optimum Yield (OY). This is defined as the amount of fish which:

[92] ALASKA DEPARTMENT OF FISH AND GAME DIVISION OF COMMERCIAL FISHERIES NEWS RELEASE 2015 NORTHERN SOUTHEAST INSIDE (NSEI) SABLEFISH FISHERY ANNUAL HARVEST OBJECTIVE ANNOUNCEMENT http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/541935269.pdf

[93] North Pacific Fisheries Management Council website http://www.npfmc.org/

a) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;
b) is prescribed as such on the basis of the MSY from the fishery, as reduced by any relevant economic, social, or ecological factor; and
c) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the MSY in such fishery.

OY is given as a range for the groundfish complexes in the BSAI and the GOA, and the sum of the TACs of all groundfish species (except Pacific halibut) is required to fall within the range. The range for BSAI is 1.4 to 2.0 million mt[94] while the range for GOA is 116 to 800 thousand mt[95]. To prevent overfishing, NPFMC management objectives include the following measures specific to Optimum Yield:[96]

1) Adopt conservative harvest levels for multi-species and single species fisheries and specify optimum yield; 2) continue to use the 2 million mt optimum yield cap for the BSAI groundfish fisheries; and 3) provide for adaptive management by continuing to specify optimum yield as a range.

The Tier System

The second element of the Precautionary Approach is the Tier system, which specifies the maximum permissible Allowable Biological Catch (ABC) and Overfishing Limit (OFL) for each stock in the complex (usually individual species but sometimes species groups). NPFMC inaugurated the Tier system in fisheries management, and the details, including tier definitions, and various reference points used, can be found in the previous Section, C6. As noted previously, sablefish falls into Tier 3b.

OFL, ABC, ACL and TAC

The third element of the precautionary approach is the ACL, OFL, ABC and TAC system. Allowable Biological Catch (ABC) is a scientifically acceptable level of harvest based on the biological characteristics of the stock and its current biomass level. Overfishing Limit (OFL) is a limiting catch level, corresponding to fishing at MSY level, higher than ABC, which demarcates the boundary beyond which the fishery is no longer viewed as sustainable. In application, the NPFMC sets TAC ≤ ABC < OFL. Since 1981, actual groundfish harvests have averaged approximately 90% of the cumulative TAC and 65% of the cumulative ABC because of the complex array of accountability measures governing these fisheries. The harvest control rule used to determine the ABC is intended to account for scientific uncertainty in two ways: First, the control rule is structured explicitly in terms of the type of information available, which is related qualitatively to the amount of scientific uncertainty. Second, the size of the buffer between max FABC in the Tier of the ABC control rule and FOFL in the Tier of the OFL control rule varies directly with the amount of scientific uncertainty. For the information levels associated with the remaining tiers, relating the buffer between max FABC and FOFL to the amount of scientific uncertainty is more difficult

[94] Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. 2015. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501 http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf

[95] Fishery Management Plan for Groundfish of the Gulf of Alaska. 2015. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501 http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf

[96] Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. 2015. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501

because the amount of scientific uncertainty is harder to quantify, so buffers of fixed size are used instead.[97]

Overfishing definitions

To the extent practicable, two status determinations are made annually for each stock and stock complex. The first is the "overfishing" status, which describes whether catch is too high. The second is the "overfished" status, which describes whether biomass is too low. These are based on the National Standard Guidelines definitions. The Magnuson-Stevens Act also requires identification of any fisheries that are "approaching a condition of being overfished," which is defined as a determination that the fishery "will become overfished within two years." As noted in the previous section, based on projections done by the SAFE authors, sablefish is not subject to overfishing, is not overfished, and is not approaching an overfished condition.

Bycatch Limits

TAC is set either at ABC or below, so managing the fisheries to not exceed TAC is equivalent, or more conservative in some cases, than managing to the ACL. The target fishery is usually closed before reaching the TAC, allowing for bycatch in other fisheries up to the amount of TAC for a species. A directed fishery closure limits retention of a species to a portion of other species TACs open to directed fishing. That portion is called the maximum retainable amount (MRA). The MRA is expressed as a percentage of an alternate target fishery. All retention is prohibited if the total TAC is caught before the end of the year. Prohibiting retention removes any incentive to increase incidental catch as a portion of other fisheries. If the ABC is taken and the trajectory of catch indicates the OFL may be approached, additional closures are imposed. To prevent overfishing, specific fisheries identified by gear and area that incur the greatest incidental catch are closed. Closures expand to other fisheries if the rate of take is not sufficiently slowed.[98]

The NPFMC determines the TAC based on social and economic considerations. In application, the NPFMC sets TAC ≤ ABC < OFL. Actual groundfish harvests have averaged approximately 90% of the cumulative TAC and 65% of the cumulative ABC. The four main reasons that TAC may be set lower than ABC are: (1) to remain under the 2 million mt OY limit; (2) to increase a rebuilding rate or address other conservation issues; (3) to limit incidental bycatch, for example of halibut; or (4) to account for state water removals. Fisheries are managed in-season to achieve the TACs without exceeding the ABC or OFL.

State waters

In state waters, five sablefish state fisheries are managed by the ADFG and the BOF outside the IFQ program. Two minor state fisheries (Cook Inlet and the Aleutian Islands) are managed using a Guideline Harvest Level (GHL), which is determined based on harvest history, fishery performance, and the federal survey for the area. Three major state fisheries exist which are limited entry and are located in Prince William Sound, Chatham and Clarence Strait. The Prince William Sound sablefish fishery is managed using a GHL and derived from the estimated area of sablefish habitat and a yield-per-unit-area model. For the Clarence and Chatham Strait fisheries an annual harvest objective is set with regard to survey and fishery catch per unit effort and biological characteristics of the population. In addition, in Chatham Strait an annual stock assessment is performed which includes a mark-recapture estimate of the population abundance. In this stock area, an F50% biological reference point was used for calculating the 2015 ABC (see previous section for details).

[97] Ibid.
[98] Ibid

D. Management Measures

8. Management shall adopt and implement effective measures including; harvest control rules and technical measures applicable to sustainable utilization of the fishery and based upon verifiable evidence and advice from available scientific and objective, traditional sources.

FAO CCRF 7.1.1/7.1.2/7.1.6/7.4.1/7.6.1/7.6.9/12.3

FAO Eco 29.2/29.4/30

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating determination

The federal sablefish fishery is managed under an Individual Fishing Quota system (IFQ). Under the major State-managed sablefish fisheries, the use of an equal quota share system is very much like individual fishery quotas, and produces the same efficiencies. The 2006 reauthorization of the MSA included the requirement that the NPFMC specify Annual Catch Limits (ACLs) with accompanying accountability measures when setting annual harvest quotas. The guidelines stipulated that ACL may not exceed ABC and that if ACL=ABC=OFL, then the proposal will prevent overfishing with accountability measures. Because Council's groundfish FMPs are multiyear plans, their plans provide that if ACL is exceeded in one year, then accountability measures are triggered for the next year to assure compliance and to subsequently account for whatever catches, bycatch or discards previously unaccounted. The Federal FMP for the BSAI and GOA list numerous fishery closures that are in place throughout Alaska, and there are also a number of closed areas in state-managed waters. These closures apply to a range of vessels, seasons, and gear types. The NMFS and the ADFG have well-established regulations on fishing seasons and legal gear use. Longline, trawl and pot gear are all regulated to increase selectivity of the target species and to avoid bycatch, discards, and ghost fishing. In addition to this, management measures and operational methods (i.e. MRA, PSC) are in place to regulate and account for bycatch and discards of encountered bycatch species. Recent improvements have been implemented in the observer program, and efforts are underway to introduce electronic at-sea monitoring on some fleets.

Federal waters

Derivation and management of catch limits

The AFSC's Resource Ecology and Fisheries Management (REFM) Division conducts research and data collection to support an ecosystem approach to management of Northeast Pacific and eastern Bering Sea fish and crab resources. More than twenty-five groundfish and crab stock assessments are developed annually, including sablefish, and used by the NPFMC to set catch quotas. In addition, economic and ecosystem assessments are provided to the Council on an annual basis. Division scientists evaluate how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate.[99]

Sablefish in Alaska is managed through the use of individual fishing quotas (IFQ). Sigler and Lunsford (2001)[100] found that IFQ management for sablefish in Alaska increased fishery catch rate

[99] NOAA Fisheries Resource Ecology and Fisheries Management Division http://www.afsc.noaa.gov/REFM/Default.php

[100] Sigler, M.F. and C.R. Lunsford. 2001. Effects of individual quotas on catching efficiency and spawning potential in the Alaska sablefish fishery. Can. J. Fish. Aquat. Sci. 58: 1300–1312 (2001). http://www.nrcresearchpress.com/doi/pdf/10.1139/f01-074

and decreased harvest of immature fish. Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The improved catching efficiency of the IFQ fishery reduced the variable costs incurred in attaining the quota. Under the major State-managed sablefish fisheries, the use of an equal quota share system is very much like IFQs, and produces the same efficiencies.

The NPFMC system of deriving catch limits is spelled out in the annual Fishery Management Plans (FMP)[101], and summarized in detail in Section C7 above. Based on the annual Stock Assessment and Fishery Evaluation (SAFE) report, the NPFMC will recommend to the Secretary of Commerce TACs and apportionments thereof for each target species, including sablefish. The Secretary will implement annual TACs which may address up to 2 fishing years, following public comment and NPFMC recommendations at the December Council meeting. The current NPFMC apportionment for sablefish includes provisions that vessels using fixed gear may harvest no more than 50% of the TAC in the Bering Sea and 75% of the TAC in the Aleutian Islands; and that vessels using trawl gear may harvest no more than 50% of the TAC in the Bering Sea and 25% of the TAC in the Aleutian Islands.[102]

The 2006 reauthorization of the MSA included the requirement that the Council's SSC specify Annual Catch Limits (ACLs) with accompanying accountability measures when setting annual harvest quotas. The guidelines stipulated that ACL may not exceed ABC and that if ACL=ABC=OFL, then the proposal will prevent overfishing with accountability measures. Because Council's groundfish FMPs are multiyear plans, their plans provide that if ACL is exceeded in one year, then accountability measures are triggered for the next year to assure compliance (50 CFR 600.310 (f)(5))[103] and to subsequently account for whatever catches, bycatch or discards previously unaccounted. Please also refer to the reference points, tier, and harvest control system as explained in Section C7.

The NMFS Restricted Access Management Program (RAM) is responsible for managing Alaska Region permit programs, including those that limit access to the Federally-managed fisheries of the North Pacific. RAM responsibilities include providing program information to the public, determining eligibility and issuing permits, processing transfers, collecting landing fees and related activities. RAM also prepares and distributes reports on landings in the Pacific halibut and sablefish Individual Fishing Quota (IFQ) program[104]. Because the main sablefish harvest is conducted under an IFQ management system, once the target harvest (TAC) is determined by the NPFMC process, NMFS/RAM sets the individual fishing quotas to not exceed the available harvest. This process is additionally conservative for two reasons. First, IFQ is often harvested over a number of fishing trips. If the quota available on the final trip is small, it may not be economically profitable to return to the fishing grounds to harvest it and it is left on the table. Second, the sum of the IFQs by area may not be achieved due to the regulatory repercussions of IFQ overages being sufficient to cause most IFQ holders to slightly fish under their annual IFQ.[105]

[101] Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. 2015. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501. http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf

[102] Ibid.

[103] NMFS's National Standards Guidelines 50 C.F.R. 600.310 et seq. http://www.nmfs.noaa.gov/sfa/CMS_DEV/Councils/Training2013/G1_Nat_Standards_Guidelines.pdf

[104] NOAA Fisheries Restricted Access Management - Permits, Licenses, Reports http://alaskafisheries.noaa.gov/ram/

[105] FAO Corporate Document Repository ALLOCATION OF INDIVIDUAL VESSEL QUOTA IN THE ALASKAN PACIFIC HALIBUT AND SABLEFISH FISHERIES http://www.fao.org/docrep/005/y2684e/y2684e22.htm

The MSA's National Standard 9 governs federal regulators. It states that conservation and management measures shall, to the extent practicable, A) minimize bycatch and B) to the extent bycatch cannot be avoided; minimize the mortality of such bycatch[106]. Regulations in place address waste, discard, bycatch, and endangered species interactions in the sablefish fisheries. The NMFS promulgates these regulations through the NPFMC. The Council's objective is to develop incentive programs for bycatch reduction including the development of mechanisms to facilitate the formation of bycatch pools, vessel bycatch allowances, or other bycatch incentive systems[107]. They also encourage research programs to evaluate current population estimates for non-target species with a view to setting appropriate bycatch limits, as information becomes available. Prohibited Species Catch (PSC) limits by fishery, season, or area are another measure to control bycatch of economically important and gear susceptible (from other fisheries) species. These include halibut, salmon, king and snow crab and the attainment of the allowed caps in a given fishery, effectively closes the fishery down for the season or year.

Since 2013, the restructured North Pacific groundfish observer program expanded coverage to vessels <60 ft LOA and implemented a more flexible system. This system, now in its third year of operation, was designed to provide better by-catch data for future stock assessments and to include the halibut fishery, which previously was not fully observed. A detailed report was produced by NMFS in 2015 on the 2014 Observer Program, and the relevant science-related material from that report was summarized in Section B.4 above. In addition to the science data, there is also information in this report pertaining to management issues, such as the cooperative relationship between the Alaska Division (AKD) of NOAA's Office for Law Enforcement's (OLE) and the Observer Program, as well as the observer's compliance reporting role.[108] Additional detail on compliance and monitoring aspects in the sablefish fishery are provided in Section E below.

As noted in Section B4 above, NMFS and the NPFMC have developed an Electronic Monitoring (EM) Strategic Plan to integrate video monitoring into the Observer Program. It is the intention of NMFS to initiate a program for the implementation of electronic monitoring of the Alaska fleets (including halibut and sablefish) to improve data collection. The NPFMC, at its meeting in December 2014, reviewed its Electronic Monitoring Workgroup's progress in developing a cooperative research plan for 2015, and moving towards pre-implementation of EM in 2016. The Workgroup outlined a timeframe for how the fieldwork and pre-implementation years will intersect with the Council's analytical process and EM's eventual integration into the Annual Deployment Plan process.[109]

Closures and seasons

The NPFMC FMPs[110] for the BSAI and GOA list in detail the fishery closures that are in place throughout Alaska. These closures apply to different vessels and gear types. For example, there are closures to all vessels (e.g. fishing or anchoring within the Sitka Pinnacles Marine Reserve is prohibited at all times); and certain gears/seasons (e.g. use of trawl gear is prohibited at all times in the Southeast Outside district, year-round in the Crab and Halibut Protection Zone and the

[106] NMFS's National Standards Guidelines 50 C.F.R. 600.310 et seq.
http://www.nmfs.noaa.gov/sfa/CMS_DEV/Councils/Training2013/G1_Nat_Standards_Guidelines.pdf

[107] Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. 2015. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501.

[108] NMFS (National Marine Fisheries Service). 2015. North Pacific Groundfish and Halibut Observer Program 2014 Annual Report. NOAA, 709 West 9th Street. Juneau, Alaska 99802.

[109] http://www.npfmc.org/wp-content/PDFdocuments/newsletters/news1214.pdf

[110] Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. 2015. Fishery Management Plan for Groundfish of the Gulf of Alaska. 2015. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501

Pribilof Island Habitat Conservation Area). Closures also apply to non-pelagic trawl (e.g. the use of non-pelagic trawl is prohibited in Cook Inlet). The Gulf of Alaska Slope Habitat Conservation Area is closed to non-pelagic trawling year-round. The use of bottom contact gear is prohibited in the Gulf of Alaska Coral and Alaska Seamount Habitat Protection Areas year-round and in the Aleutian Islands Coral Habitat Protection Areas year-round. The use of mobile bottom contact gear is prohibited year-round in Bowers Ridge Habitat Conservation Zone. The following figure shows numerous examples of closed areas in Alaskan waters (see also Fig 13.5, in Section 13 below).

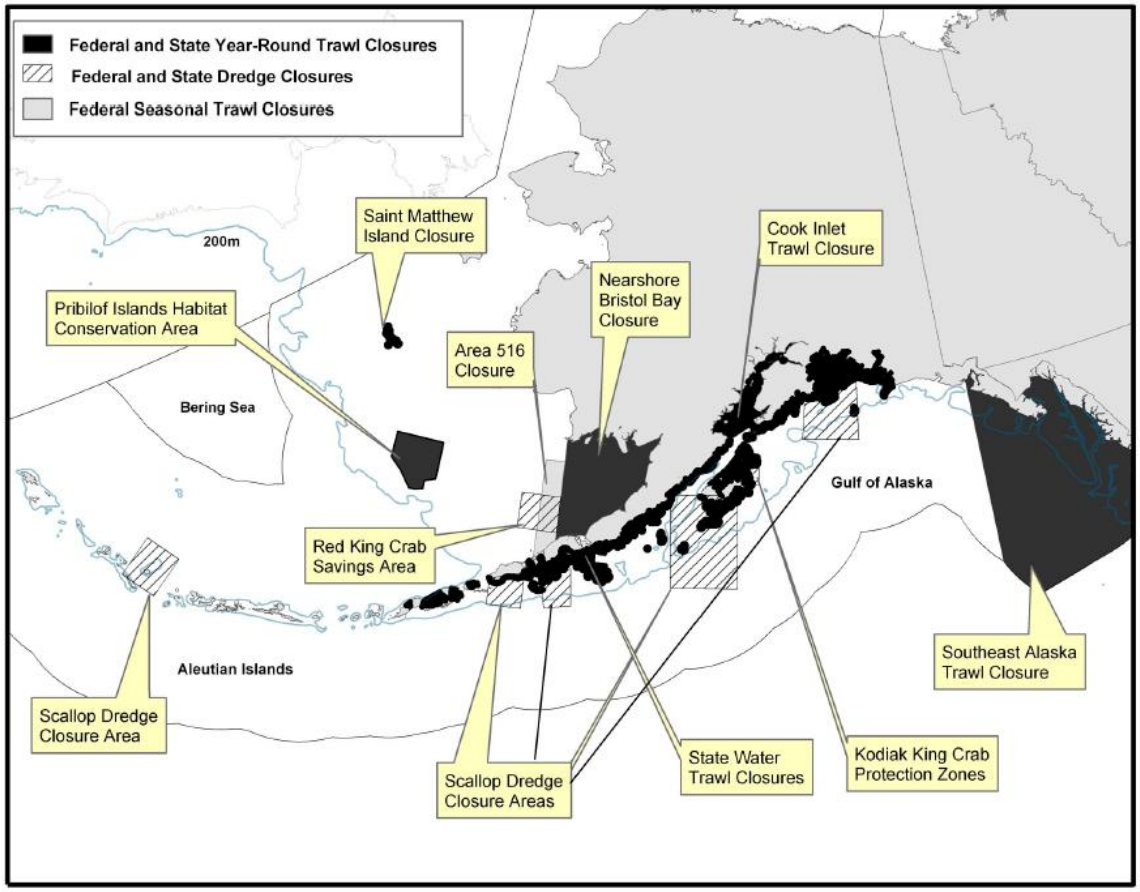


Fig D8.1. Map showing some of the closed areas in Alaskan waters.[111]

Area allocation of harvests

In December 1999, the NPFMC apportioned the 2000 ABC and OFL based on a 5-year exponential weighting of the survey and fishery abundance indices. The same algorithm has been used to apportion the ABC and OFL since 2000. Since 2007, the average change in apportionment by area has increased annually. While some of these changes may actually reflect inter-annual changes in regional abundance, they most likely reflect the high movement rates of the population and the high variability of estimates of abundance in the BSAI areas. The SAFE authors[112] recommended fixing the apportionment at the proportions calculated in the 2013 assessment until the apportionment scheme has been thoroughly re-evaluated and reviewed. A project begun in 2012

[111] Witherell, D. and D. Woodby. 2005. Application of Marine Protected Areas for Sustainable Production and Marine Biodiversity off Alaska. Marine Fisheries Review 67(1):1-27. http://spo.nmfs.noaa.gov/mfr671/mfr6711.pdf

[112] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. NPFMC, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424

has re-examined the apportionment strategy and a further objective is to conduct management strategy evaluation. There has been significant progress toward a spatial assessment model, but the management strategy evaluations have not yet begun, so it seemed imprudent to move to an interim apportionment or return to the former scheme until more satisfactory methods were identified and evaluated. Therefore, for 2015, the SAFE authors recommended keeping the apportionment fixed at the proportions used in 2014[113].

Table D8.1. Apportionment of sablefish ABC among federal regions for the 2015 ABC.[114]

Area	2014 ABC	Standard apportionment for 2015 ABC	Recommended fixed apportionment for 2015 ABC*	Difference from 2014
Total	13,722	13,657	**13,657**	-0.5%
Bering Sea	1,339	2,210	**1,333**	-0.5%
Aleutians	1,811	1,840	**1,802**	-0.5%
Gulf of Alaska (subtotal)	10,572	9,607	**10,522**	-0.5%
Western	1,480	1,445	**1,473**	-0.5%
Central	4,681	3,975	**4,658**	-0.5%
W. Yakutat**	1,574	1,428	**1,567**	-0.5%
E. Yak. / Southeast**	2,837	2,759	**2,823**	-0.5%

* Fixed at the 2012 assessment apportionment proportions (Hanselman et al. 2012). ** Before 95:5 hook and line: trawl split shown below.

Adjusted for 95:5 hook-and-line: trawl split in EGOA	Year	W. Yakutat	E. Yakutat/Southeast
	2015	1,708 t	2,682 t
	2016	1,552 t	2,436 t

State waters

Fisheries and apportionments

Major state fisheries take place in Prince William Sound (PWS) and Chatham Strait and Clarence Strait in Southeast Alaska. These are limited entry fisheries. At the time the federal IFQ program began, the State established two minor fisheries in Cook Inlet and the Aleutian Islands, so that open-access fisheries were available to fishermen that were not allowed to participate in the IFQ program. The basis of stock assessments and management decisions and measures for these five fisheries has been described in previous Sections of this report. Detailed announcements concerning the allowable catches, management regulations, etc. for the state managed sablefish fisheries for 2015 have been referenced in previous sections, and can be found on the ADF&G website.[115]

Sablefish are caught primarily with longline gear in Alaska; however, the Clarence Strait area has both a season for pot and longline gear. The Aleutian Islands state fishery allows longline, pot, jig, and hand troll gear, and one trawl vessel qualifies for the limited entry program in PWS. In federal waters, sablefish are primarily caught in directed fisheries on longline gear; however, an increasing trend toward pot gear exists due to whale depredation of sablefish on longline gear.[116]

Fishermen in the state-managed fisheries must register prior to fishing and are required to keep a logbook during the fishery. Completed logbook pages must be attached to the ADF&G copy of the fish ticket at the time of delivery. Logbooks must include, by set, the date and time gear is set and

[113] Ibid.
[114] Ibid.
[115] ADF&G Regulation Announcements, News Releases, and Updates http://www.adfg.alaska.gov/index.cfm?adfg=cfnews.main
[116] ADF&G Sablefish Management http://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management

retrieved, specific location of harvest by latitude and longitude for start and ending positions, hook spacing, amount of gear (number of hooks and skates) used, depth of set, estimated weight of the target species, estimated weight of bycatch by species, whether the target species was sablefish or halibut, and if there was any lost gear. A permit holder must retain all visibly injured or dead sablefish. Sablefish that are not visibly injured or dead may be released unharmed, and the permit holder must record in the logbook, by set, the number of live sablefish released [5 Alaska Administrative Code 28.170(f)].[117]

State water closures to commercial fishery harvests (see Fig. D8.1 for some examples) have been enacted by the Alaska BOF for research purposes and to conserve fish stocks, protect habitats, reduce bycatch, and provide subsistence and recreational harvest opportunities. These closures are enacted through regulations governing invertebrate dive fisheries, scallop dredge fisheries, crab pot fisheries, shrimp, Pandalus spp., fisheries, and various groundfish fisheries, including sablefish. There are also many closures affecting nearshore Pacific herring and Pacific salmon fisheries.[118]

Fishing gear

Sablefish are caught primarily with longline gear in Alaska. Fixed gear (longlines and pots) harvests approximately 90% of the sablefish quota and trawl gear approximately 10%. The trend is fairly stable in recent years. The vast majority of sablefish is caught in the Gulf of Alaska, as shown in Fig. B4.2 above. In federal waters, sablefish are primarily caught in directed fisheries on longline gear, however, an increasing trend toward pot gear exists due to whale depredation of sablefish on longline gear. Pot fishing occurs in the BSAI where it accounts for nearly half of the Individual Fishing Quota (IFQ) catch, and although pot fishing does not currently occur in the GOA, there are measures currently being considered to allow this. In addition to the fixed gears, sablefish are caught as bycatch in trawl fisheries.

Longline gear
Longline gear fishing has been developed over a long period of time to be selective of target species. As an example, specific regulations were put in place intended to reduce the incidental mortality of the short-tailed albatross, a listed species under the Endangered Species Act (ESA). The BOF enacted changes to state law, mirroring federal regulations within state waters for groundfish fisheries to include the regulatory use of a number of measures (e.g. streamer or tory lines, night setting, line shooter and lining tubes) which have been shown to reduce seabird interactions very significantly when setting or retrieving gear.

Under the Individual Quota Fishery system in Alaska's federal fisheries and the equal quota share in the major state waters fisheries, much less gear is used/lost than in open competitive fisheries. Market forces also help to ensure that gear is cost effective.

[117] ALASKA DEPARTMENT OF FISH AND GAME DIVISION OF COMMERCIAL FISHERIES NEWS RELEASE 2015 NORTHERN SOUTHEAST INSIDE (NSEI) SABLEFISH FISHERY ANNUAL HARVEST OBJECTIVE ANNOUNCEMENT http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/541935269.pdf
[118] Witherell, D. and D. Woodby. 2005. Application of Marine Protected Areas for Sustainable Production and Marine Biodiversity off Alaska. Marine Fisheries Review 67(1):1-27.

Pot gear

In December 2014 the NPFMC released an Initial Review Draft Environmental Assessment/ Regulatory Impact Review/ Initial Regulatory Flexibility Analysis[119] for a Proposed Amendment to the Fishery Management Plan for Groundfish of the Gulf of Alaska and Federal regulations implementing the sablefish and Pacific halibut fisheries off Alaska to allow the use of pot longline gear in the GOA Sablefish Individual Fishing Quota Fishery. In March, 2015, a similar NPFMC document[120] analyzed proposed management measures that would apply exclusively to the sablefish IFQ fishery in the GOA. The considered measures include: (1) redefine legal gear to include pot longline gear, potentially subject to a pot limit enforced by pot-identification tags, (2) require the location of sablefish pots set or lost on the fishing grounds to be submitted to an electronic database, (3) require that pot longline gear be moved or tended within a certain amount of time after being set, (4) require marking of pot longline gear, and (5) allow retention of Pacific halibut if sufficient IFQ is held by fishermen to cover both the sablefish and halibut IFQ caught using pot longline gear. Subsequently, the NPFMC approved a motion allowing the use of pot gear in sablefish IFQ fishery in the Gulf of Alaska at its meeting in April 2015[121]. This NPFMC motion included various restrictions on number of pots and soak times for pots in different areas, as well as a review on the effects of allowing GOA Sablefish longline pot gear which is to be conducted 3 years after implementation. NMFS will also be requested to include pot gear effort in their management report to the Council. The Council's action still faces a lengthy regulatory process and is not likely to go into effect until 2017, based on discussions with NOAA Fisheries' Alaska Region Division of Sustainable Fisheries.

Federal and state regulations[122],[123] define pot gear for all groundfish (i.e., there is no distinction between pot gear for different species such as Pacific cod or sablefish). Pot gear means a portable structure designed and constructed to capture and retain fish alive in the water. This gear type includes longline pot and pot-and-line gear. Each groundfish pot must comply with a number of specifications, including use of a biodegradable panel, and tunnel openings (rigid or soft) which must not exceed maximum dimensions.

Trawl gear

By regulation, there is no directed trawl fishery for sablefish, and they are taken as by-catch in several trawl fisheries, including rockfish. However, directed fishing standards have allowed some trawl hauls to target and retain sablefish, where the bycatch is similar to the longline fishery, in addition, perhaps, to some deep dwelling flatfish [124]. The bottom trawl gear in the BSAI has been modified (regulation effective January 20th 2011, see Amendment 94 to the BSAI FMP) to have elevating devices (bobbins) which have been shown to reduce the impact on both the seafloor (up to 90%) and the associated non-target invertebrates (e.g. king crabs). Effective from February 18th 2014, Amendment 89 to the GOA groundfish FMP, revised regulations have been in place governing the configuration of modified nonpelagic trawl gear. This rule requires that nonpelagic

[119] NMFS & NOAA Proposal: Allow the Use of Pot Longline Gear in the Gulf of Alaska Sablefish Individual Fishing Quota Fishery December 2014 http://npfmc.legistar.com/gateway.aspx?M=F&ID=563b0e56-6b83-470f-9352-95a8c63cb65c.pdf

[120] http://npfmc.legistar.com/gateway.aspx?M=F&ID=95e23bb6-64b6-4736-80b8-d40f3dc64787.pdf

[121] North Pacific Fishery Management Council C6 GOA Sablefish Longline Pots Motion 4/12/15 http://npfmc.legistar.com/gateway.aspx?M=F&ID=da3c4f62-1562-4f29-a266-ce722ca64507.docx

[122] 50 CFR 679a2 §679.2 Definitions https://alaskafisheries.noaa.gov/regs/679a2.pdf

[123] 5 AAC 28.050. Lawful gear for groundfish http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:%275+aac+28!2E050%27]/doc/{@1}?firsthit

[124] NOAA Fisheries Essential Fish Habitat (EFH) 5-year Review https://alaskafisheries.noaa.gov/habitat/efh/review.htm

trawl gear used in the directed flatfish fisheries in the Central Regulatory Area of the GOA be modified to raise portions of the gear off the sea floor, in the same manner as established in the BSAI three years earlier.[125],[126] The modifications to nonpelagic trawl gear used in these fisheries will reduce the unobserved injury and mortality of Tanner crab, and will reduce the potential adverse impacts of nonpelagic trawl gear on bottom habitat. Finally, this rule makes a minor technical revision to the modified nonpelagic trawl gear construction regulations to facilitate gear construction for those vessels required to use modified nonpelagic trawl gear in the GOA and Bering Sea groundfish fisheries.

The NMFS and the ADFG have well-established regulations on fishing seasons and legal gear use. Discards of sablefish tend to be small and these are accounted for toward the overall TAC by observer data. Management measures and operational methods (i.e. Maximum Retainable Amounts and Prohibited Species Catch) are in place to account for bycatch and discards of encountered bycatch species. The trawl fishery operates under strict MRAs for sablefish.

[125] North Pacific Fisheries Management Council Fisheries Management Plans http://www.npfmc.org/fishery-management-plans/

[126] Federal Register Amendment 89 to the Gulf of Alaska Groundfish Fishery Management Plan Area Closures for Chionoecetes bairdi Crab Protection in Gulf of Alaska Groundfish Fisheries https://www.federalregister.gov/regulations/0648-BB76/amendment-89-to-the-gulf-of-alaska-groundfish-fishery-management-plan-area-closures-for-chionoecetes

9. There shall be defined management measures designed to maintain stocks at levels capable of producing maximum sustainable levels.

FAO CCRF 7.1.8/7.6.3/7.6.6/8.4.5/8.4.6/8.5.1/8.5.3/8.5.4/8.11.1/12.10

FAO Eco 29.2bis

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

No significant change has occurred since the previous surveillance assessment in 2014. The MSA governs management of the Alaskan federally managed fisheries. The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The rigorous process in place for over 30 years ensures that annual quotas are set at conservative, sustainable levels for all managed groundfish stocks. Model projections indicate that the sablefish stock in Alaska is neither overfished nor approaching an overfished condition. For Tier 3 stocks, the MSY proxy level is defined as B35%. Projected female spawning biomass (combined areas) for 2015 is 91,183 t (88% of B40%), placing sablefish in sub-tier "b" of Tier 3. The MSY, defined in the BSAI and GOA groundfish FMPs, is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions, fishery technological characteristics (e.g., gear selectivity), and distribution of catch among fleets. The MSY allows defining the reference points used to manage the groundfish fisheries such that TAC ≤ ABC < OFL. The harvest control rule is designed to ensure the population is capable of producing MSY. Some state managed fisheries are based on the federal data and reference points, while others use stat-collected survey data to determine harvest levels. State catches of sablefish are often below the specified GHLs.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) is the primary domestic legislation governing management of the nation's marine fisheries. The act establishes MSY as the basis for fishery management and requires that: the fishing mortality rate does not jeopardize the capacity of a stock or stock complex to produce MSY; the abundance of an overfished stock or stock complex be rebuilt to a level that is capable of producing MSY; and OY not exceed MSY.[127] Under the MSA, the NPFMC is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, a Fishery Management Plan (FMP) and any necessary amendments, for each fishery under its authority that requires conservation and management. These include Groundfish FMPs for the GOA and the BSAI which incorporate the sablefish fisheries in those regions.[128] The MSA contains ten national standards, with which all FMPs must conform and which guide fishery management. Besides the MSA, NPFMC fisheries management must be consistent with the requirements of other regulations including the Marine Mammal Protection Act, the Endangered Species Act, the Migratory Bird Treaty Act, and several other Federal laws.

The MSY, defined in the BSAI and GOA groundfish FMPs, is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions, fishery technological characteristics (e.g., gear selectivity), and distribution of catch among fleets. The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. A number of measures have been implemented over the years to ensure sustainability in the sablefish fishery, such as reduction of capacity through introduction of IFQs, improvements in the observer program, etc. The rigorous process in place for over 30 years

[127] http://www.nmfs.noaa.gov/sfa/CMS_DEV/Councils/Training2013/G1_Nat_Standards_Guidelines.pdf

[128] a) Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. 2015. b) Fishery Management Plan for Groundfish of the Gulf of Alaska. 2015. North Pacific Fishery Management Council, 605 W. 4th Avenue, Suite 306, Anchorage, Alaska 99501

ensures that annual quotas are set at conservative, sustainable levels for all managed groundfish stocks. This has allowed reference points used in managing the groundfish fisheries to be set such that TAC ≤ ABC < OFL.

As noted previously, sablefish are managed under Tier 3 of NPFMC harvest rules. From the 2014 SAFE, projected female spawning biomass (combined areas) for 2015 is 91,183 t (88% of B40%), placing sablefish in sub-tier "b" of Tier 3 (see definitions in Section C6). The maximum permissible value of FABC under Tier 3b is 0.082, which translates into a 2015 ABC (combined areas) of 13,657 t. The OFL fishing mortality rate is 0.098 which translates into a 2015 OFL (combined areas) of 16,128 t.[129]

Under the NPFMC precautionary approach, thresholds are defined in the Council's harvest rules. These are when the spawning biomass falls below MSY or B35% and when the spawning biomass falls below ½ MSY or B17.5% which calls for a rebuilding plan under the MSA. The 2014 SAFE authors estimated the probability that next year's spawning biomass was below B35% to be 0.89. During the next three years, the probability of falling below B17.5% is near zero, the probability of falling below B35% is 0.97, and the probability of staying below B40% is near 100% (see Fig. C6.1 above)[130].

In the state-managed fisheries, the Cook Inlet, Prince William Sound and the Aleutian Islands fisheries have harvest limits (GHL) and are managed using NMFS assessment data, and therefore federal reference points. For the NSEI area, the 2013 point estimate of abundance was used to forecast abundance and biomass for the 2015 fishery using updated biological data from the fishery and survey. As in previous years, an F50% biological reference point was used for calculating the 2015 ABC, resulting in a harvest rate of 7.1%. The SSEI sablefish population is managed based on relative abundance trends from survey and fishery CPUE data, as well as with survey and fishery biological data that are used to describe the age and size structure of the population and detect recruitment events. Details for the state-managed fisheries have been provided in Sections B5 and C6. Although there are no reference points for most, the state fisheries appear to be well managed, with recent catches often being less than the specified GHLs.

[129] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. Stock Assessment and Fishery Evaluation Reports for the Groundfish Resources of the Bering Sea/Aleutian Islands and Gulf of Alaska Regions. NPFMC, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 283-424

[130] Ibid.

10. Fishing operations shall be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations.

FAO CCRF 8.1.7/8.1.10/8.2.4/8.4.5

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating determination

Any aspirant sablefish fisherman must have 150 days of sablefish fishing experience before being able to purchase sablefish IFQs. Obtaining sablefish IFQ share most often will require the purchaser to enter into loan capital arrangements with banks that will require comprehensive fishing business plans supported by competent, professional fishermen with demonstrable fishing experience. Several training opportunities are available to train crew members in Alaska.

Any aspirant sablefish fisherman must have 150 days of sablefish fishing experience before being able to purchase sablefish IFQs. Obtaining sablefish IFQ share most often will require the purchaser to enter into loan capital arrangements with banks that will require comprehensive fishing business plans supported by competent, professional fishermen with demonstrable fishing experience. This competence and professionalism is a learned experience with the culmination of entrants into the fishery starting at deck hand level working their way up through proof of competence.

In addition to the practical training necessary to enter the fishing industry, the NPFMC and Board of Fisheries meetings are public and the process involves extensive industry representation for input into the management process and the drafting of new regulations in a changing conservation environment. Through selected industry representation at these meetings, individual fishermen are kept up to date and remain aware of new requirements for fisheries as they arise.

The State of Alaska, Department of Labor & Workforce Development (ADLWD) includes AVTEC (formerly called Alaska Vocational Training & Education Center, now called Alaska's Institute of Technology). One of AVTEC's main divisions is the Alaska Maritime Training Center. The goal of the Alaska Maritime Training Center is to promote safe marine operations by effectively preparing captains and crew members for employment in the Alaskan maritime industry.[131]

The Alaska Maritime Training Center is a United States Coast Guard (USCG) approved training facility located in Seward, Alaska, and offers USCG/STCW-compliant maritime training (STCW is the international Standards of Training, Certification, & Watchkeeping). In addition to the standard courses offered, customized training is available to meet the specific needs of maritime companies. Courses are delivered through the use of a world class ship simulator, state of the art computer based navigational laboratory, and modern classrooms equipped with the latest instructional delivery technologies. Supplemental to their on-campus classroom training, the Alaska Maritime

[131] State of Alaska, Department of Labor & Workforce Development AVTEC- Alaska's Institute of Technology. Accessed 2015 http://www.avtec.edu/

Training Center has a partnership with the Maritime Learning System to provide mariners with online training for entry-level USCG Licenses, endorsements, and renewals.[132]

The University of Alaska Sea Grant Marine Advisory Program (MAP) provides education and training in several sectors, including fisheries management, in the forms of seminars and workshops.[133]
In addition, MAP conducts sessions of their Alaska Young Fishermen's Summit (AYFS). Each Summit is an intense, 2/3-day course in all aspects of Alaska fisheries, from fisheries management & regulation, to seafood markets & marketing. The target audience for these Summits is young Alaskans from coastal communities. The 2013 AYFS was held in December 10 through December 15 in Anchorage. The conference aimed at providing crucial training and networking opportunities for fishermen entering the business or wishing to take a leadership role in their industry. The next Summit is due to take place in Juneau 27-29th January 2016.

In addition, MAP conducts sessions of their Alaska Young Fishermen's Summit (AYFS). Each Summit is an intense, 3-day course in all aspects of Alaska fisheries, from fisheries management & regulation, to seafood markets & marketing. The target audience for these Summits is young Alaskans from coastal communities. The summit provides three days of training in the land-based aspects of running a fishing operation: marketing, business management, the fisheries regulatory process, and the science impacting fisheries management, a visit to the Anchorage office of the Alaska Department of Fish & Game, where participants can meet with fisheries managers and researchers.[134]

Finally, the Alaska Marine Safety Education Association (AMSEA) provides courses on small boating safety, drill conductor training, stability and damage control, ergonomics, dredger safety and survival at sea training. [135]

[132] State of Alaska, Department of Labor & Workforce Development AVTEC- Alaska's Institute of Technology. Alaska Maritime Training Center. Accessed 2015 http://www.avtec.edu/department/alaska-maritime-training-center

[133] MAP. 2015. Marine Advisory Program, Fisheries. Alaska Sea Grant College Program, PO Box 755040, Fairbanks, Alaska, 99775-5040 http://seagrant.uaf.edu/map/fisheries/

[134] SEAGRANT. 2015. Alaska Young Fishermen's Summit. Marine Advisory Program main office 1007 West 3rd Ave, Suite 100; Anchorage, AK 99501. https://seagrant.uaf.edu/map/workshops/2013/ayfs/

[135] AMSEA. 2014. ALASKA MARINE SAFETY EDUCATION ASSOCIATION HOMEPAGE. 2924 Halibut Point Road ~ Sitka, AK 99835 http://www.amsea.org/

E. Implementation, Monitoring and Control

11. An effective legal and administrative framework shall be established and compliance ensured through effective mechanisms for monitoring, surveillance, control and enforcement for all fishing activities within the jurisdiction.

FAO CCRF 7.1.7/7.7.3/7.6.2/8.1.1/8.1.4/8.2.1
FAO Eco 29.5

Evidence adequacy rating:

☑ **High** ☐ **Medium** ☐ **Low**

Rating Determination

The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce Alaska federal fisheries laws and regulations, especially 50CFR679. The federal violations in this fishery are reported to and investigated by NOAA's Office of Law Enforcement's Alaska Division and prosecuted by NOAA's Office of General Counsel's Enforcement Section. OLE Special Agents and Enforcement Officers conduct complex criminal and civil investigations, board vessels fishing at sea, inspect fish processing plants, review sales of wildlife products on the internet and conduct patrols on land, in the air and at sea. NOAA Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements (SS) or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation (GCEL). The Alaska Wildlife Troopers (AWT) enforce state regulations.

The U.S. Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE) enforce Alaska fisheries laws and regulations in federal waters, especially 50CFR679.

Patrols, Partnerships, and Inspections

The U.S. Coast Guard and NMFS's OLE enforce the regulations that govern fishing under the IFQ Program. The Alaska Division patrols provide compliance inspections, a visible deterrent to would-be violators, and availability to stakeholders to receive information and guidance. NOAA OLE works closely with the State of Alaska Wildlife Troopers (AWT) and the US Coast Guard to maximize compliance by sharing information, intelligence, knowledge, and resources. The formalized Cooperative Enforcement Agreement and Joint Enforcement Agreement with the Alaska Wildlife Troopers provide the state with federal funding for personnel, equipment, operations, and authorization for State Troopers to enforce federal fishing regulations while engaged in their regular duties.

USCG

The U.S. Coast Guard (USCG) is the lead federal maritime law enforcement agency for enforcing national and international law on the high-seas, outer continental shelf and inward from the U.S. Exclusive Economic Zone (EEZ) to inland waters. The USCG also patrols US waters to reduce foreign poaching, and inspects fishing vessels for compliance with safety requirements. The U.S. Coast Guard now focuses its efforts at sea. Since 2006 NMFS OLE Alaska Division (AKD) has monitored offloads and provided after-hours surveillance.

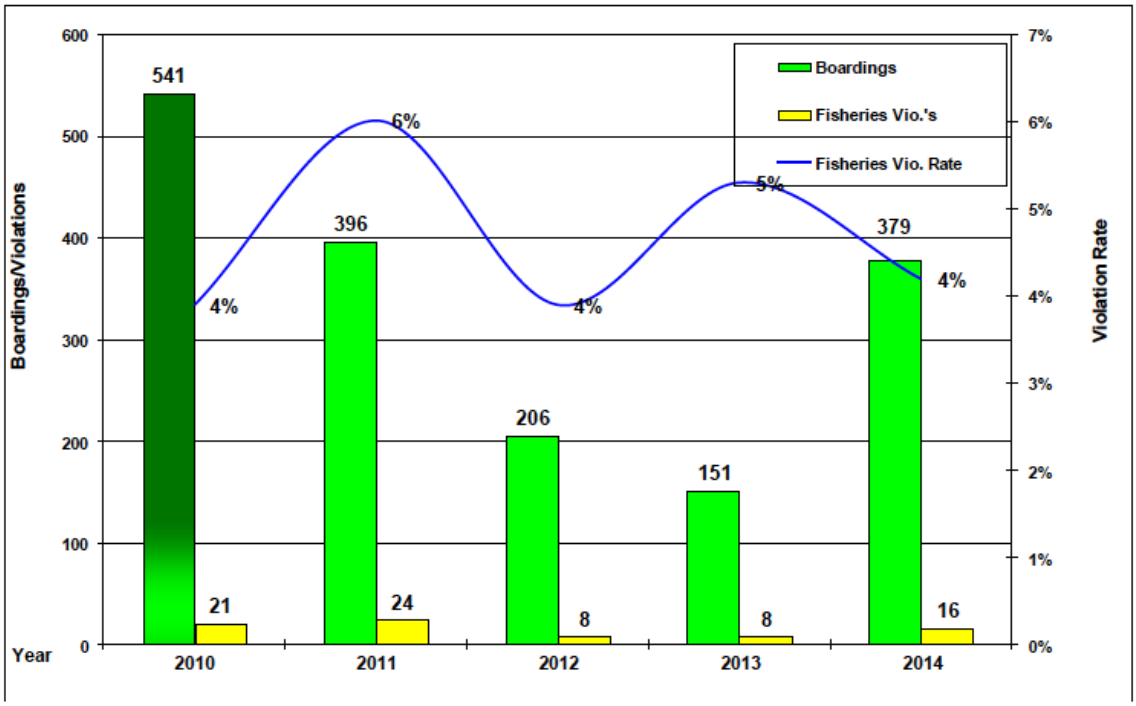


Figure E 11.1 IFQ Sablefish and halibut Enforcement. [136]

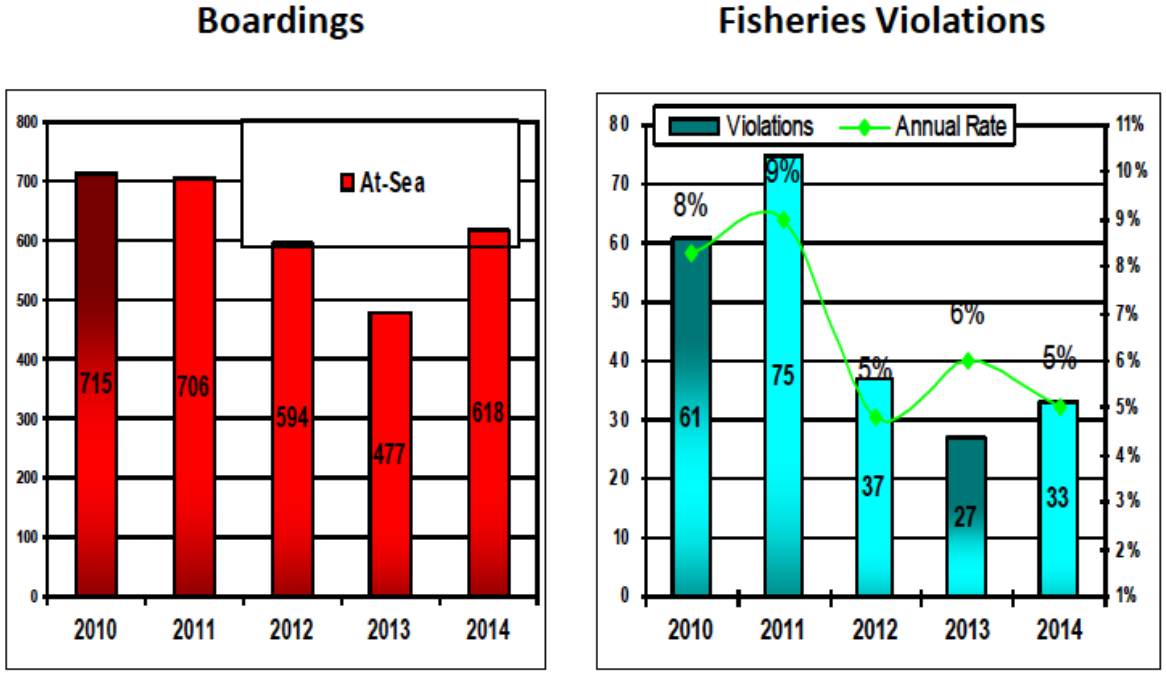


Figure E11.2 USCG Boardings and Fisheries Violations[137]

[136] North Pacific Fisheries Management Council Enforcement Committee http://www.npfmc.org/committees/enforcement-committee/

[137] USCG Year in Review http://www.npfmc.org/committees/enforcement-committee/ file:///Users/admin/Downloads/B4%20USCG%202014%20Year%20in%20Review%20-%20Feb%20NPFMC.pdf

NMFS OLE

NOAA Office of Law Enforcement Special Agents and Enforcement Officers perform a variety of tasks associated with the protection and conservation of Alaska's living marine resources. In order to enforce these laws, OLE special agents and enforcement officers use OLE patrol vessels to board vessels fishing at sea, and conduct additional patrols on land, in the air and at sea in conjunction with other local, state and Federal agencies.

In any given year, OLE Agents and Officers spend an average 10,000-11,000 hours conducting patrols and investigations, and an additional 10,000-11,000 hours on outreach activities. The OLE maintains 19 patrol boats around the country to conduct a variety of patrols including Protected Resources Enforcement Team (PRET) boardings, protection of National Marine Sanctuaries and various undercover operations.[138]

OLE Special Agents and Enforcement Officers conduct complex criminal and civil investigations, board vessels fishing at sea, inspect fish processing plants, review sales of wildlife products on the internet and conduct patrols on land, in the air and at sea. NOAA Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements (SS) or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation (GCEL). GCEL can then assess a civil penalty in the form of a Notice of Permit Sanctions (NOPs) or Notice of Violation and Assessment (NOVAs), or they can refer the case to the U.S. Attorney's Office for criminal proceedings. [139]

For perpetual violators or those whose actions have severe impacts upon the resource criminal charges may range from severe monetary fines, boat seizures and/or imprisonment levied by the United States Attorney's Office.

All landings of sablefish must be reported to NMFS via its mandatory "e-landings" reporting system. Commercial harvests of pollock, halibut and sablefish are the primary enforcement responsibilities of OLE. The IFQ, Observer and Record Keeping/Reporting programs are the foundations of the Alaska Division program responsibilities. Endangered Species Act and Marine Mammal Protection Act priorities include the Steller sea lion and Cook Inlet beluga populations in addition to many other protected resources.

[138] NOAA's Office of Law Enforcement Workforce Analysis and Staffing Allocation Plan May 2012 http://www.nmfs.noaa.gov/ole/docs/2012/ole_workforce_analysis_plan.pdf

[139] Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions NOAA Office of the General Counsel – Enforcement Section. Accessed 2015 http://www.gc.noaa.gov/documents/Penalty%20Policy_FINAL_07012014_combo.pdf

OLE Alaska Division Priorities for 2015

Magnuson-Stevens Act

High Priority

- Observer assault, harassment, or interference violations
- Felony and major civil cases involving significant damage to the resource or the integrity of management schemes
- Commercialization of sport-caught or subsistence halibut
- Maritime Boundary Line incursions by foreign fishing or transport vessels
- Outreach and education

Medium Priority

- Misdemeanor and civil cases involving observer coverage violations
- Closed Area/VMS Violations, ongoing
  - Commercial vessel incursions into closure areas or other Marine Protected Areas
- Recordkeeping and reporting violations that impact data consistency or integrity
- Violations involving lesser damage to the resource or the integrity of management schemes

Low Priority

- Catch reporting and trip limits
  - Noncompliance with trip and cumulative limits and record keeping requirements for landings of federally managed marine species, and specifically catch share programs.
- Gear violations
  - Deployment of unlawful gear utilized in commercial fisheries under NOAA's jurisdiction.
- Lesser permit violations

Endangered Species Act and Marine Mammal Protection Act

High Priority

- Violations wherein responsible subject and species are identifiable
- Lethal takes, Level A harassment with the potential to injure marine mammal stock
  - Species of interest are Cook Inlet beluga, other whale species, northern fur seal, or Steller sea lion
- Any violation involving injury or potential injury to people, such as a vessel-whale collision
- Outreach and Education

Medium Priority

- Non-lethal takes, Level B harassment with the potential to disturb a marine mammal stock in the wild by causing a disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering
- Species is threatened rather than endangered

Low Priority

- Violations wherein responsible subject is not identifiable
- Injured or dead animal cannot be located
- Objective evidence is not obtainable
- Takes of individual marine mammal species that appear consistent with legal harvest by Alaska Natives

International/Lacey Act

High Priority

- Felony and major civil violations (e.g., interstate or foreign trafficking of commercial quantities of illegally harvested fish or marine resources)
- Harvest or transshipment of marine resources by foreign fishing vessels
- Domestic or international violations involving seafood safety; substantive mislabeling of product in domestic or international commerce
- IUU listed vessels

Medium Priority

- Misdemeanor and civil violations (e.g., interstate or foreign trafficking of small quantities of illegally harvested fish or marine resources)
- Mislabeling violations
- IUU identified product

Low Priority

- Minor mislabeling violations
- Violations wherein responsible subject/vessel not identifiable

[140]

The Alaska Enforcement Division (AKD) uses Enforcement Officers (EO's), Special Agents (SA's) and partnerships with other agencies to provide effective enforcement for over 842,000 square miles of ocean, 6,600 miles of coastline and 2,690 islands off of Alaska. EO's conduct patrols and inspections and provide compliance assistance and SA's investigate civil and criminal violations of marine resource laws.

Compliance Assistance

During FY2014, AKD personnel spent over 1,550 hours providing compliance assistance, outreach/education and public relations with marine resource users. This is a decrease from 2,280 hours in 2013. This includes staffing booths at major organized events in Alaska and Washington as well as daily contacts in communities, ports and harbors and at-sea to ensure that the most current and accurate regulatory information is widely distributed and understood.

Patrol, Monitoring, and Inspections

During this reporting period, AKD personnel spent over 4,600 hours conducting patrols to provide a visible deterrence to potential violators; to monitor fishing and other marine activities; to detect violations; to conduct compliance inspections, and to provide compliance assistance. This is an increase from 3,515 hours in 2013.

AWT

[140] NOAA's Office of Law Enforcement National and Division Enforcement Priorities for 2012-2017 February 2015 http://www.nmfs.noaa.gov/ole/docs/2015/noaa_ole_priorities_web.pdf

The Alaska Wildlife Troopers (AWT) and ADFG enforce fisheries regulations in state waters. The Department of Public Safety, Division of Alaska Wildlife Troopers (AWT) is the primary state fish and wildlife resource enforcement agency in the state of Alaska. AWT is the only state enforcement agency with jurisdiction of state and federal lands as well as state waters. AWT also has a Joint Enforcement Agreement (JEA) with NOAA Fisheries Office of Law Enforcement (NOAA/OLE).[141]

[141] AWT. 2015. Marine Enforcement Section webpage. 5700 E Tudor Road, Anchorage, AK 99507 http://dps.alaska.gov/awt/Marine.aspx

12. There shall be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.

FAO CCRF 7.7.2/8.2.7

Evidence adequacy rating:

☑ High **☐ Medium** **☐ Low**

Rating determination

The Magnuson-Stevens Act (50CFR600.740 Enforcement policy) provides four basic enforcement remedies for violations: ***1)*** *Issuance of a citation (a type of warning), usually at the scene of the offense,* ***2)*** *Assessment by the Administrator of a civil money penalty,* ***3)*** *for certain violations, judicial forfeiture action against the vessel and its catch,* ***4)*** *Criminal prosecution of the owner or operator for some offenses. In some cases, the Magnuson-Stevens Act requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. The 2011 Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions issued by NOAA Office of the General Counsel – Enforcement and Litigation, provides guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. The Alaska Wildlife troopers enforce state water regulations with a number of statutes that enable the government to fine, imprison, and confiscate equipment for violations and restrict an individual's right to fish if convicted of a violation*.

The Magnuson-Stevens Act provides four basic enforcement remedies for violations (50CFR600.740 Enforcement policy).

(1) Issuance of a citation (a type of warning), usually at the scene of the offense (15 CFR part 904, subpart E).

(2) Assessment by the Administrator of a civil money penalty.

(3) For certain violations, judicial forfeiture action against the vessel and its catch.

(4) Criminal prosecution of the owner or operator for some offenses.

In some cases, the Magnuson-Stevens Act requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. In sum, the Magnuson-Stevens Act treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator.

III	$2,000-$5,000	$5,000-$10,000	$10,000-$15,000	$15,000-$25,000
IV	$5,000-$15,000	$15,000-$25,000	$25,000-$50,000 and permit sanction of 10-20 days*	$50,000-$80,000 and permit sanction of 20-60 days*
V	$15,000-$25,000	$25,000-$50,000 and permit sanction of 10-20 days*	$50,000- $80,000 and permit sanction of 20-60 days*	$60,000- $100,000 and permit sanction of 60-180 days*
VI	$25,000-$50,000	$50,000-$80,000 and permit sanction of 20-60 days*	$60,000-$100,000 and permit sanction of 60-180 days*	$100,000-statutory maximum and permit sanction of 1 year-permit revocation*

Figure E 12.1 Magnuson-Stevens Penlty Matrix [142]

On March 16, 2011, NOAA issued a new Penalty Policy that provided guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. In that Policy, the NOAA General Counsel's Office committed to periodic review of the Penalty Policy to consider revisions or modifications as appropriate.

The July 2014 revised version of the Penalty Policy is a result of that review. The purpose of the 2014 Policy is to ensure that: (1) civil administrative penalties and permit sanctions are assessed in accordance with the laws that NOAA enforces in a fair and consistent manner; (2) penalties and permit sanctions are appropriate for the gravity of the violation; (3) penalties and permit sanctions are sufficient to deter both individual violators and the regulated community as a whole from committing violations; (4) economic incentives for noncompliance are eliminated; and (5) compliance is expeditiously achieved and maintained to protect natural resources.

Under the new revised Policy, NOAA expects to continue to promote consistency at a national level, provide greater predictability for the regulated community and the public, maintain transparency in enforcement, and more effectively protect natural resources. The effective date of this Policy was July 1, 2014. This Policy supersedes all previous guidance regarding the assessment of penalties or permit sanctions, and all previous penalty and permit sanction schedules issued by the NOAA Office of the General Counsel. Currently pending cases charged under the March 16, 2011 Penalty Policy, will continue to be governed by that Policy until those cases have been finally adjudicated.
While the overall approach to this revised Penalty Policy remains largely the same, notable changes to the previous Penalty Policy issued on March 16, 2011 include:
(1) Addition of more detail in some penalty schedules to better describe the most commonly occurring violations;

[142] Magnuson-Stevens Penlty Matrix http://www.nmfs.noaa.gov/sfa/reg_svcs/Councils/ccc_2011/Tab%20L%20-%20Enforcement%20Issues/Enforcement%20Issues.pdf

(2) Clearer distinctions among multiple-level violations to ensure consistent application of the Penalty Policy;
(3) Revision of the treatment of prior violations so that prior adjudicated violations older than 5 years are no longer considered an aggravating factor;
(4) Ensuring consistent application of the Penalty Policy to recreational offenses by replacing the commercial/recreational distinction as a penalty adjustment factor with the additional Level I and II penalties that capture recreational violations;
(5) Creating a new penalty adjustment for "such other matters as justice may require" by combining the "Activity After Violation" factor with new considerations.

The new 2014 revised Policy provides guidance for the NOAA Office of the General Counsel, but does not, nor is it intended to, create a right or benefit, substantive or procedural, enforceable at law or in equity, in any person or company. The basis for penalties calculated under this Policy, however, will be included in charging documents filed by the Agency. Further, although this Policy provides guidance regarding the assessment of proposed penalties and permit sanctions, NOAA retains discretion to assess the full range of penalties authorized by statute in any particular case.

For significant violations, the NOAA attorney may recommend charges under NOAA's civil administrative process (*see* 15 C.F.R. Part 904), through issuance of a Notice of Violation and Assessment of a penalty (NOVA), Notice of Permit Sanction (NOPS), Notice of Intent to Deny Permit (NIDP), or some combination thereof. Alternatively, the NOAA attorney may recommend that there is a violation of a criminal provision that is sufficiently significant to warrant referral to a U.S. Attorney's office for criminal prosecution.[143]

The Alaska Region Summary Settlement and fix-it schedule is available at this page http://www.gc.noaa.gov/enforce-office3.html [144]under the Alaska region tab.

The Alaska Wildlife troopers enforce state water regulations. Here below are presented some of the statutes that enable the government to fine, imprison, and confiscate equipment for violations and restrict an individual's right to fish if convicted of a violation.

AS 16.05.165. Form and issuance of citations
AS 16.05.170 Power to execute warrant
AS 16.05.180 Power to search without warrant
AS 16.05.190 Seizure and disposition of equipment
AS 16.05.195 Forfeiture of equipment
AS 16.05.332 Wildlife Violator Compact
AS.16.05.410 Revocation of license
AS 16.05.710 Suspension of Commercial License and Entry Permit

[143] Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions NOAA Office of the General Counsel – Enforcement Section http://www.gc.noaa.gov/documents/Penalty%20Policy_FINAL_07012014_combo.pdf
[144] NOAA Penalty Policy and Schedules. Accessed 2015. http://www.gc.noaa.gov/enforce-office3.html

AS 16.05.722 Strict liability commercial fishing penalties
AS 16.05.723 Misdemeanor commercial fishing penalties
AS 16.05.896 Penalty for causing material damage
AS 16.05.901 Penalty for violations of AS 16.05.871 – AS 16.05.896.
AS 16.05.030 Penalty for violation of 16.10.010-16.10.050
AS 16.10.090 Penalty for violation of AS 16.10.090
AS 16.10.220 Penalty for violation of AS 16.10-200-16.1-.210
AS 16.10.790 Fines
AS 16.40.290 Penalty
AS 16.43.960 Commission revocation or suspension of permits
AS 16.43.970 Penalties

These are under Alaska Statutes Title 16 (laws); Alaska Administrative Code Title 5 (regulations).[145]

Finally, the cooperation of citizens and industry is cultivated through programs such as AWT's Fish & Wildlife Safeguard program, which encourages the reporting of violations, and "leverages" the range of enforcers.

At each of the five annual Council meetings, representatives of the USCG, OLE, NMFS, ADFG and AWT meet in an Enforcement Meeting where enforcement concerns with plan amendments are discussed and materials relating to those concerns are prepared for the Council. During staff reports to the Council the USCG and the OLE present information about vessel boardings and enforcement violations by the fishing industry that occurred since the last Council meeting. [146]

[145] The Alaska State Legislature. Accessed 2015 http://www.legis.state.ak.us/basis/aac.asp#TitleTable
[146] 50CFR600.740 Enforcement policy
NOAA. Update of NOAA Fisheries Enforcement Programs and Operations. Accessed 2015.http://www.nmfs.noaa.gov/sfa/reg_svcs/Councils/ccc_2011/Tab%20L%20-%20Enforcement%20Issues/Enforcement%20Issues.pdf

F. Serious Impacts of the Fishery on the Ecosystem

13. Considerations of fishery interactions and effects on the ecosystem shall be based on best available science, local knowledge where it can be objectively verified and using a risk based management approach for determining most probable adverse impacts. Adverse impacts on the fishery on the ecosystem shall be appropriately assessed and effectively addressed.

FAO CCRF 7.2.3/8.4.7/8.4.8/12.11
Eco 29.3/31

Evidence adequacy rating:

☑High **☐Medium** **☐Low**

Rating Determination

The NPFMC and NOAA/NMFS conduct assessments and research related to fishery impacts ecosystems and habitats and how environmental factors affect the fishery. Findings and conclusions are published in the Ecosystem section of the SAFE document, annual Ecosystem Considerations documents, and the various other research reports. The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS, 2005) concluded that the benthic longline and pot fisheries have minimal or temporary impacts on sablefish habitat. Various studies have applied ecosystem models to food webs and impacts of climate change. Sablefish have low discard rates in other fisheries. The directed sablefish fishery takes significant amounts of grenadiers, arrowtooth flounder, spiny dogfish, sharks and some rockfish; but the fishery does not pose a threat to bycatch species. Management measures limit interactions with seabirds and the fishery has minimal impact on the short-tailed albatross, the only seabird listed as endangered under the ESA. Interactions with whales remain a problem as they take fish off longline gear, but the fishery does not adversely affect whale populations.

1. Research and institutional capacity

NPFMC and NOAA/NMFS conduct assessments and research on environmental factors as affected by the commercial sablefish fishery and associated species and their habitats. Findings and conclusions are published annually in the Ecosystem Considerations section of the SAFE report.

The SAFE reports include sablefish sections for 1) ecosystem effects on the stock and 2) effects of the fishery on the ecosystem. NOAA's Fishery and the Environment (FATE) program and Resource Ecology and Ecosystem Management (REEM) group sponsors an Alaska Marine Ecosystem Considerations webpage that provides the latest SAFE Ecosystems Considerations report plus recent research findings and resources.[147]

[147] Alaska Marine Ecosystem Considerations webpage. Accessed 2015 http://access.afsc.noaa.gov/reem/ecoweb/Index.php

2. Ecosystem considerations

Table F13.1 Summary of the ecosystem considerations for the sablefish fisheries.[148]

Indicator	*Observation*	*Interpretation*	*Evaluation*
ECOSYSTEM EFFECTS ON STOCK			
Prey availability or abundance trends			
Zooplankton	None	None	Unknown
Predator population trends			
Salmon	Decreasing	Increases the stock	No concern
Changes in habitat quality			
Temperature regime	Warm increases recruitment	Variable recruitment	No concern (can't affect)
Prevailing currents	Northerly increases recruitment	Variable recruitment	No concern (can't affect)
FISHERY EFFECTS ON ECOSYSTEM			
Fishery contribution to bycatch			
Prohibited species	Small catches	Minor contribution to mortality	No concern
Forage species	Small catches	Minor contribution to mortality	No concern
HAPC biota (seapens/whips, corals, sponges, anemones)	Small catches, except long-term reductions predicted	Long-term reductions predicted in hard corals and living structure	Possible concern
Marine mammals and birds	Bird catch about 10% total	Appears to be decreasing	Possible concern
Sensitive non-target species	Grenadier, spiny dogfish, and unidentified shark catch notable	Grenadier catch high but stable, recent shark catch is small	Possible concern for grenadiers
Fishery concentration in space and time	IFQ less concentrated	IFQ improves	No concern
Fishery effects on amount of large size target fish	IFQ reduces catch of immature	IFQ improves	No concern
Fishery contribution to discards and offal production	sablefish <5% in longline fishery, but 30% in trawl fishery	IFQ improves, but notable discards in trawl fishery	Trawl fishery discards definite concern
Fishery effects on age-at-maturity and fecundity	trawl fishery catches smaller fish, but only small part of total catch	slightly decreases	No concern

3. Fishery interactions with the ecosystem

Fishery-specific concentration of target catch in space and time relative to predator needs in space and time (if known) and relative to spawning components:

[148] Hanselman, D.H., C. Lunsford, and C. Rodgveller. 2014. Assessment of the sablefish stock in Alaska. In Stock assessment and fishery evaluation report for the groundfish resources of the GOA and BS/AI. North Pacific Fishery Management Council, 605 W 4th Ave, Suite 306 Anchorage, AK 99501. pp. 576-717.

- The sablefish fishery is largely dispersed in space and time. The longline fishery lasts 8-1/2 months. The quota is apportioned among six regions of Alaska.

Fishery-specific effects on amount of large size target fish:

- The longline fishery catches mostly medium and large-size fish which are typically mature. The trawl fishery, which on average accounts for about 10% of the total catch, often catches slightly smaller fish. The trawl fishery typically occurs on the continental shelf where juvenile sablefish sometimes occur. Catching these fish as juveniles reduces the yield available from each recruit.

Fishery-specific effects on age-at-maturity and fecundity of the target species:

- The shift from an open access to an IFQ fishery has decreased harvest of immature fish and improved the chance that individual fish will reproduce at least once (Sigler and Lunsford 2001[149]).

At the ecosystem scale, mass water movements and temperature changes appear related to recruitment success. Above-average recruitment was somewhat more likely with northerly winter currents and much less likely for years when the drift was southerly. Recruitment was above average in 61% of the years when temperature was above average, but was above average in only 25% of the years when temperature was below average. Growth rate of young-of-the-year sablefish is higher in years when recruitment is above average (Sigler et al. 2001)[150]. Shotwell et al. (2014)[151] showed that colder than average wintertime sea surface temperatures in the central North Pacific may represent oceanic conditions that create positive recruitment events for sablefish in their early life history.

a. Gear habitat interactions

Fishery-specific effects on EFH non-living substrate:

- The primary fishery for sablefish is with longline gear. While it is possible that longlines could move small boulders it is unlikely fishing would persist where this would often occur. Relative to trawl gear, a significant effect of longlines on bedrock, cobbles, or sand is unlikely.[152]

b. Ecosystem modeling.

[149] Sigler, M. F. and C. R. Lunsford. 2001. Effects of individual quotas on catching efficiency and spawning potential in the Alaska sablefish fishery. Can. J. Fish. Aquat. Sci. 58: 1300-1312.
[150] Sigler, M. F., T. L. Rutecki, D. L. Courtney, J. F. Karinen, and M.-S.Yang. 2001. Young-of-the-year sablefish abundance, growth, and diet. Alaska Fish. Res. Bull. 8(1): 57-70.
[151] Shotwell, S.K., D.H. Hanselman, and I.M. Belkin. 2014. Toward biophysical synergy: Investigating advection along the Polar Front to identify factors influencing Alaska sablefish recruitment. Deep-Sea Res. II, http://www.researchgate.net/publication/267761356_Toward_biophysical_synergy_Investigating_advection_along_the_Polar_Front_to_identify_factors_influencing_Alaska_sablefish_recruitment
[152] http://www.afsc.noaa.gov/REFM/Docs/2014/BSAIsablefish.pdf

Earlier ecosystem research (NOAA, 2002) developed ECOPATH trophic web models that included sablefish and applied ecosystem modeling for fishery sustainability (NOAA/ AFSC, 2006). These models primarily use a mass balance food web approach with dynamic differential equations describing predator-prey interactions as it has used previously in many other fished marine ecosystems. Other studies have evaluated impacts of climate change on West Coast sablefish. They used models to include environmental variability directly into stock assessments and to demonstrate how it can affect estimation of recruitment parameters, stock status, and conservation benchmarks (Shirippa, et al. 2009).

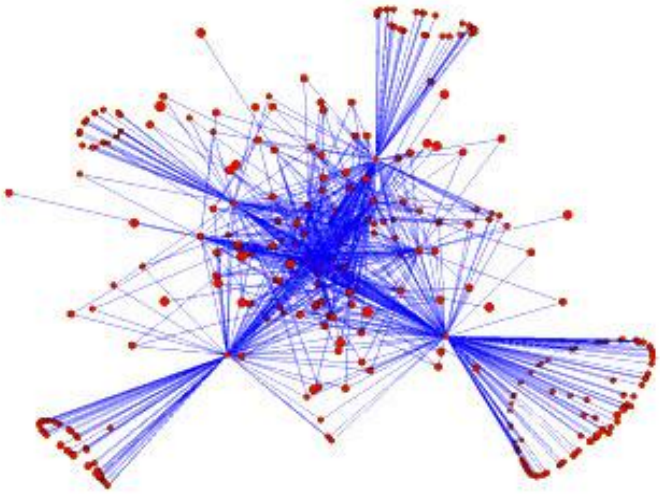


Figure F13.1. Food web constructed from the GOA food habits database, where each species is a node (dots) and each predator-prey interaction is a link (lines). The four "hubs" apparent in the figure are cod, pollock, halibut, and arrowtooth flounder. (NOAA / AFSC, 2006).[153]

c. Discards

Fishery-specific contribution to discards and offal production:

Discards of sablefish in the longline fishery are small, typically less than 5% of total catch. The catch of sablefish in the longline fishery typically consists of a high proportion of sablefish, 90% or more. However at times grenadiers may be a significant catch and they are almost always discarded.

Sablefish discards by target fisheries are available for hook-and-line gear and other gear combined. From 1994 to 2004 discards averaged 1,357 t for the GOA and BSAI combined (Hanselman et al. 2008). Since then, discards have been lower, averaging 614 t between 2007 and 2013. The highest discard amounts occur in hook-and-line fisheries in the GOA (Table 16). [154]

[153] NOAA Technical Memorandum NMFS-AFSC-130 A Comparison of the Eastern Bering and Western Bering Sea Shelf and Slope Ecosystems Through the Use of Mass-Balance Food Web Models http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-130.pdf

[154] http://www.afsc.noaa.gov/REFM/Docs/2014/BSAIsablefish.pdf

Table F13.2. Discarded catches of sablefish (amount [t], percent of total catch, total catch [t]) by gear (H&L=hook & line, Other = Pot, trawl, and jig, combined for confidentiality) by FMP area for 2007-2013. Source: NMFS Alaska Regional Office via AKFIN, October 24, 2014.[155]

		BSAI			GOA			Combined		
Year	Gear	Discard	%Discard	Catch	Discard	%Discard	Catch	Discard	%Discard	Catch
2007	Total	66	2.84%	2,338	556	4.11%	13,547	622	3.92%	15,884
	H&L	16	2.25%	707	256	2.07%	12,379	272	2.08%	13,086
	Other	50	3.09%	1,631	300	25.71%	1,168	351	12.53%	2,799
2008	Total	100	4.90%	2,040	755	5.98%	12,623	855	5.83%	14,663
	H&L	93	10.99%	850	674	5.73%	11,760	768	6.09%	12,610
	Other	6	0.54%	1,189	81	9.35%	863	87	4.24%	2,052
2009	Total	24	1.19%	2,014	739	6.65%	11,112	763	5.82%	13,126
	H&L	17	1.39%	1,213	659	6.44%	10,223	675	5.91%	11,436
	Other	7	0.90%	801	499	4.53%	11,016	88	5.21%	1,690
2010	Total	43	2.31%	1,849	371	4.02%	9,231	461	3.85%	11,976
	H&L	36	2.90%	1,234	47	5.22%	896	407	3.89%	10,465
	Other	7	1.12%	614	574	5.12%	11,222	54	3.57%	1,511
2011	Total	25	1.47%	1,729	396	3.90%	10,145	599	4.63%	12,951
	H&L	18	1.63%	1,092	169	15.84%	1,068	413	3.68%	11,237
	Other	8	1.20%	637	327	2.74%	11,917	186	10.86%	1,714
2012	Total	25	1.30%	1,948	253	2.29%	11,060	343	2.48%	13,856
	H&L	13	1.10%	1,197	65	7.62%	848	266	2.17%	12,257
	Other	12	1.63%	750	626	5.24%	11,944	77	4.81%	1,598
2013	Total	30	1.79%	1,697	579	5.21%	11,099	657	4.81%	13,641
	H&L	27	2.51%	1,066	47	5.60%	845	605	4.98%	12,165
	Other	4	0.59%	630	3987	4.83%	82,482	51	3.47%	1,476
2007-2013	Total	45	2.26%	1,945	521	4.59%	11,259	614	4.48%	13,728
Mean	H&L	31	3.25%	1,051	274	6.93%	5,431	487	4.11%	11,894
	Other	13	1.29%	893	913	8.22%	18,659	128	6.38%	1,834

d. Bycatch

Fishery-specific contribution to bycatch of prohibited species, forage species, Habitat Area of Particular Concern (HAPC) biota, marine mammals and birds, and other sensitive non-target species:

The sablefish fishery catches significant portions of the shark and thornyhead rockfish total catch. The sablefish fishery catches the majority of grenadier total catch; the annual amount is variable. The trend in seabird catch is variable, but is substantially low compared to the 1990s, presumably due to widespread use of measures to reduce seabird catch.

The shift from an open-access to an IFQ fishery has increased catching efficiency, which has reduced the number of hooks deployed (Sigler and Lunsford 2001). Although the effects of longline gear on bottom habitat are poorly known, the reduced number of hooks deployed during the IFQ fishery must reduce the effects on benthic habitat. The IFQ fishery likely has also reduced discards of other species because of the slower pace of the fishery and the incentive to maximize value from the catch.

Sablefish discards by target fisheries are available for hook-and-line gear and other gear combined (see above). From 1994 to 2004 discards averaged 1,357 t for the GOA and BSAI combined

[155] Ibid.

(Hanselman et al. 2008). Since then, discards have been lower, averaging 614 t between 2007 and 2013. The highest discard amounts occur in hook-and-line fisheries in the GOA.

Table F13.3 shows the bycatch of the GOA and BSAI Fishery Management Plans' (FMP) species in the sablefish target fishery. The largest bycatch is Thornyhead rockfish (520 t/year, 151 t discarded). Arrowtooth is the only species that has substantial catch from non-longline gear.
Arrowtooth flounder and shark are the 2nd and 3rd most caught species at 348 t/year and 331 t/year. The next groups are GOA shortraker rockfish, "Other rockfish", and GOA longnose skate which total 535 t/year. Other nontarget catches that have totals over a ton per year are corals, snails, sponges, sea stars, and miscellaneous fishes and crabs.

Table F.13.3. Bycatch (t) of FMP Groundfish species in the targeted sablefish fishery averaged from 2009-2013. Other = Pot and trawl combined because of confidentiality. Source: AKFIN, October 31, 2014.[156]

	Hook and Line			Other Gear			All Gear		
Species	Discard	Retained	Total	Discard	Retained	Total	Discard	Retained	Total
GOA Thornyhead Rockfish	147	346	493	4	23	27	151	369	520
Arrowtooth Flounder	198	40	238	106	4	110	304	44	348
Shark	330	0	331	1	0	1	331	0	331
GOA Shortraker Rockfish	127	91	219	11	9	20	138	101	239
Other Rockfish	57	95	153	2	1	3	59	96	156
GOA Skate, Longnose	133	7	139	1	0	1	134	7	140
GOA Rougheye Rockfish	55	80	135	2	3	5	57	83	140
GOA Skate, Other	133	2	136	2	0	2	135	2	137
Pacific Cod	40	46	85	1	4	5	41	50	91
Other Species	84	1	85	1	0	1	85	1	86
Greenland Turbot	23	51	74	10	1	10	33	52	85
BSAI Skate	52	0	52	0	-	0	52	0	52
GOA Deep Water Flatfish	8	0	8	16	5	22	24	5	30
Pacific Ocean Perch	1	0	1	2	15	17	2	15	18
BSAI Kamchatka Flounder	12	2	13	3	0	3	15	2	17
BSAI Shortraker Rockfish	5	8	14	0	0	0	6	8	14
BSAI Other Flatfish	11	0	11	1	0	1	12	0	12
GOA Rex Sole	0	-	0	8	4	11	8	4	11
Sculpin	10	-	10	0	0	0	10	0	10
Total	1,315	728	2,046	220	102	322	1,535	830	2,369

Non-target, Non-FMP bycatch

Table F13.4. Bycatch of nontarget species and HAPC biota in the targeted sablefish fishery.

[156] http://www.afsc.noaa.gov/REFM/Docs/2014/BSAIsablefish.pdf

	Estimated Catch (t)				
Group Name	2009	2010	2011	2012	2013
Benthic urochordata	0.01	0.13	0.13	1.08	0.00
Birds	0.47	0.45	1.46	0.22	0.64
Bivalves	0.04	0.04	0.05	0.01	0.00
Brittle star unidentified	0.45	0.12	0.44	4.52	0.10
Corals Bryozoans	2.21	3.33	5.57	7.57	12.75
Dark Rockfish	0.14	0.00	0.00	0.03	0.07
Eelpouts	1.83	1.38	0.58	0.62	1.11
Giant Grenadier	6,011	4,767	6,973	6,993	8,083
Greenlings	0.07	0.00	0.02	0.00	0.00
Grenadier	1,139	864	843	1,020	1,519
Hermit crab unidentified	0.10	0.19	0.21	0.08	0.09
Invertebrate unidentified	1.53	2.08	2.02	6.81	0.18
Misc crabs	3.29	1.89	1.13	0.31	0.51
Misc crustaceans	2.36	0.00	0.00	0.00	0.00
Misc deep fish	0.00	0.00	0.00	0.00	0.00
Misc fish	5.03	6.20	8.43	10.12	28.81
Scypho jellies	0.08	0.11	0.69	0.00	0.00
Sea anemone unidentified	2.26	1.49	3.29	0.99	0.92
Sea pens whips	0.52	0.35	1.58	0.25	0.28
Sea star	2.97	3.91	3.45	2.99	18.79
Snails	10.79	11.49	20.04	12.08	8.77
Sponge unidentified	2.17	1.05	2.08	0.94	3.31
Urchins, dollars, cucumbers	1.64	0.58	0.26	0.78	0.72

Prohibited species catches (PSC)

Prohibited species catches (PSC) in the targeted sablefish fisheries are dominated by halibut (1,224 t/year) and golden king crab (66,000 individuals/year). Halibut catches were low in 2013, while golden king crab catches have dropped precipitously from 210,000 individuals in 2011 to very few in 2013, probably as a result of low sampling effort in BSAI sablefish pot fisheries (table F13.5).

Table F13.5. Prohibited Species Catch (PSC) estimates reported in tons for halibut, thousands of animals for crab, by year, and fisheries management plan (BSAI or GOA) area for the sablefish fishery. Other = Pot and trawl combined because of confidentiality. Source: NMFS AKRO Blend/Catch Accounting System PSCNQ via AKFIN, October 31, 2014.

	2010			2011			2012			2013			Mean
	BSAI	GOA	Total	BSAI	GOA	Total	BSAI	GOA	Total	BSAI	GOA	Total	
Hook and Line													
Bairdi Crab	-	0.06	0.06	-	-	-	-	-	-	-	0.09	0.09	0.04
Golden K. Crab	0.94	-	0.94	0.55	0.13	0.68	0.46	0.02	0.48	0.47	0.11	0.58	0.67
Halibut	341	992	1,333	182	889	1,071	129	1,456	1,585	86	708	794	1,196
Red K. Crab	0.01	-	0.01	0.02	-	0.02	0.01	-	0.01	-	0.03	0.03	0.01
Other													
Bairdi Crab	-	0.06	0.06	0.82	-	0.82	-	-	-	0.22	-	0.22	0.27
Golden K. Crab	32	-	32	210	0	210	17	0	17	1	-	1	65
Halibut	34	4	39	18	6	24	11	5	16	20	12	32	28
Red K. Crab	-	-	-	0.31	-	0.31	-	-	-	-	-	-	0.08

Bycatch in state waters

Alaska manages bycatch in state waters and sets allowable bycatch amounts for key species.

Bycatch Allowances in the NSEI sablefish state fishery

Allowable bycatch percentage indicates the amount of bycatch that may be legally landed on an NSEI sablefish permit, based on the round weight of sablefish and round weight of bycatch species or species group:

Bycatch Species	Allowable Bycatch Amount
Demersal Shelf Rockfish (DSR)	1%
Shortraker and Rougheye rockfish	7% in aggregate
Other rockfish & thornyheads	15% in aggregate
Lingcod	0%
Pacific Cod	20%
Spiny dogfish	35%
Other groundfish	20%

Full-retention and reporting of rockfish, excluding thornyheads, is required for CFEC permit holders fishing for groundfish in NSEI. All rockfish in excess of allowable bycatch limits shall be reported as bycatch overage on an ADFG fish ticket and proceeds from the sale of excess rockfish shall be surrendered to the state [5AAC 28.171(f)]. Pacific cod in excess of bycatch limits described above may be landed on a CFEC miscellaneous finfish (M) permit in areas open to directed Pacific cod fishing. Fishermen with halibut IFQ in regulatory area 2C and a CFEC halibut permit card must retain all halibut over 32 inches in length, up to the amount of their IFQ.[157]

Bycatch Allowance in the SSEI sablefish state fishery

Allowable bycatch that may be legally landed on an SSEI sablefish permit is as follows based on round weight of both target and bycatch species:

[157] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/431292948.pdf

Species	Longline fishery	Pot fishery
Demersal Shelf Rockfish (DSR)	1%	0%
Shortraker & Rougheye Rockfish	7% in aggregate	0%
Other rockfish & thornyheads	15% in aggregate	0%
Lingcod	0%	0%
Pacific Cod	20%	20%
Spiny dogfish	35%	20%
Other groundfish	20%	20%

CFEC permit holders fishing for groundfish or halibut must retain, weigh, and report all rockfish taken in SSEI. This regulation does not apply to shortspine thornyhead. All rockfish in excess of allowable bycatch limits shall be reported as bycatch overage on the fish ticket. Any proceeds from the sale of excess rockfish shall be surrendered to the state. When the directed Pacific cod fishery is open in SSEI, Pacific cod taken in excess of bycatch limits may be landed on the appropriate CFEC miscellaneous finfish permit. [158]

PWS Sablefish fishery bycatch limits

Bycatch limits by species or species aggregate for the Prince William Sound Management Area state-waters sablefish fishery are set as follows by Emergency Order 2-GF-E-06-14 as round weight of bycatch as a percentage of the round weight of the target species:

(1) may retain 20 percent Pacific cod;

(2) may retain 15 percent skate species in aggregate except that; (A)big skate (Raja binoculata) may not be retained after noon February 11, 2015;

(3) may retain 15 percent shark species in aggregate (includes spiny dogfish);

(4) may not retain lingcod prior to July 1; after July 1 may retain 20 percent lingcod;

(5) may retain 20 percent pollock;

(6) must retain all rockfish (and thornyhead) as required by 5 AAC 28.265 and any rockfish in excess of 20 percent in aggregate must be weighed and reported as bycatch overage on an ADF&G fish ticket; Page 3 of 3 NR09-GF-E-15 Sablefish Quotas Final (A)no rockfish landing or combination of landings may exceed the 5-day trip limit of 3,000 pounds

(7) may retain 20 percent other groundfish in aggregate[159]

Cook Inlet sablefish fishery bycatch allowance

Sablefish may be retained in the state waters of the Cook Inlet Management Area only by a vessel registered for the directed fishery and only when the directed season is open. [160]

Grenadier interactions and management options

Giant grenadiers, a non-target species that is soon entering both FMPs as an Ecosystem Component, make up the bulk of the nontarget species bycatch, with 2013 the highest in the last five years at 8,083 t . Their catch averages 66% of the total bycatch in the sablefish fishery. Giant grenadier is abundant on the continental slope of Alaska and scientists consider it an extremely important component of the ecosystem in this habitat. The amount of giant grenadier taken as bycatch in this region is substantial. In the GOA in 2010, the estimated catch of giant grenadier of 5,419 tons was exceeded for only five groundfish species: walleye pollock (*Gadus chalcogramma*), Pacific cod

[158] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/520501887.pdf
[159] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/521863936.pdf
[160] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/506321572.pdf

(*Gadus macrocephalus*), arrowtooth flounder (*Atheresthes stomias*), Pacific ocean perch (*Sebastes alutus*), and sablefish. Most of the giant grenadier bycatch in the GOA is from the sablefish longline fishery, and nearly all is discarded at sea with a likely mortality rate of 100%.

The Secretary of Commerce approved Amendments 100/91 on August 6th 2014, which added the grenadier complex into both FMPs as Ecosystem Components. Under this rule, they are not allowed to be targeted but there is an 8% Maximum Retainable Allowance (MRA) (Federal Register, Proposed Rules, Vol. 79, No. 93). The final rule will publish before the end of the year and so it may be effective for the start of the 2015 fishing year.

As an Ecosystem Component, a stock assessment is not required and there is no ABC or OFL. A full unofficial assessment report was prepared for grenadiers in even years since 2006, even though they were "non specified". The latest SAFE report contains a time series of catch and abundance estimates and unofficial ABC and OFL values based on Tier 5 calculations. These values are not used for management or for determining if overfishing is occurring for Ecosystem Component species/complexes. There is no definition of overfishing for an Ecosystem Component.[161]

Table F13.6. Stock Assessment information for the GOA and BSAI grenadiers in 2014.[162]

	As estimated or specified *last* year for[a]:		As estimated or recommended *this* year for:	
Quantity	2014	2015	2015	2016
M (natural mortality)	0.078	0.078	0.078	0.078
Specified/recommended Tier	5	5	5	5
Biomass (t)	597,884	597,884	524,624	524,624
F_{OFL} (F=M)	0.078	0.078	0.078	0.078
$maxF_{ABC}$ (maximum allowable = 0.75x F_{OFL})	0.0585	0.0585	0.0585	0.0585
F_{ABC}	0.0585	0.0585	0.0585	0.0585
OFL (t)	**46,635**	46,635	**40,921**	40,921
maxABC (t)	34,976	34,976	**30,691**	30,691
ABC (t)	**34,976**	34,976	**30,691**	30,691
Status	As determined *last* year for:		As determined *this* year for:	
	2012	2013	2013	2014
Overfishing	No	n/a	No	n/a

[a]The values for biomass, OFL, and ABC in these two columns are based on Rodgveller and Hulson 2013. They are an average of the last three trawl surveys that sampled down to 1,000 m. The current values (for 2015 and 2016) are from the random effects model fit to survey biomass by region and depth strata.
These are unofficial ABC and OFL values since grenadier are an Ecosystem Component, which do not have ABCs or OFLs.

Fishery impact on the shark complex

There are three species of sharks that are abundant in Alaska waters: Pacific sleeper shark, *Somniosus pacificus*, spiny dogfish, *Squalus suckleyi* , and salmon shark, *Lamna ditropis*. Currently there is no directed fishing for these species, but they are caught incidentally in other fisheries. The sablefish fishery catches significant portions of spiny dogfish and other/unidentified

[161] http://alaskafisheries.noaa.gov/npfmc/PDFdocuments/MISC/GrenadierDiscPaper521.pdf

[162] http://www.afsc.noaa.gov/REFM/Docs/2014/BSAIgrenadier.pdf

shark species.

Gulf of Alaska shark bycatch.

Spiny dogfish are allowed as retained incidental catch in some state managed fisheries, and salmon sharks are targeted by some sport fishermen in Alaska state waters. The complex was not subjected to overfishing last year. The ABC/OFL for the shark complex is the sum of the computations for the individual species. A Tier 5 approach is used for calculations of spiny dogfish, where exploitable biomass (B) is equal to the average of the biomass estimates from the last three trawl surveys (2009, 2011, 2013), the OFL = M*B, and the ABC = 0.75*OFL. The remaining shark species follow a traditional Tier 6 approach with the OFL = average historical catch (1997 – 2007) and the ABC = 0.75*OFL.

The change from the previous observer deployment regime may result in relatively small changes in estimated catch for target species, but for sharks, there is potential for significant additional estimated catch. Smaller vessels are now subject to observer coverage, and this includes vessels fishing halibut IFQ, which were previously exempt from coverage.

For 2014 the SAFE authors recommended the maximum allowable ABC of 5,989 t and an OFL of 7,986 t for the shark complex in the GOA (see tables below). Catch in 2012 was 634 t and in 2013 was 1,019 t (as of October 24). The complex was not being subjected to overfishing last year. The ABC/OFL for the shark complex is the sum of the computations for the individual species.

Table F13.7 Shark Bycatch[163]

[163] http://www.afsc.noaa.gov/REFM/Docs/2014/GOAshark.pdf

Spiny Dogfish Quantity	As estimated or *specified last* year for: 2014	 2015	As estimated or *recommended this* year for: 2015	 2016
M (natural mortality rate)	0.097	0.097	0.097	0.097
Tier	6*	6	6	6
Biomass (t)	76,452	76,452	76,452	76,452
F_{OFL}	0.097	0.097	0.097	0.097
$maxF_{ABC}$	0.073	0.073	0.073	0.073
F_{ABC}	0.073	0.073	0.073	0.073
OFL (t)	7,416	7,416	**7,416**	7,416
maxABC (t)	5,562	5,562	5,562	5,562
ABC (t)	5,562	5,562	**5,562**	5,562
Status	As determined *last* year for: 2012	 2013	As determined *this* year for: 2013	 2014
Overfishing		n/a		n/a

*While spiny dogfish are a Tier 6 species, a Tier 5 approach is used. They are not in Tier 5 because the trawl survey biomass is not considered reliable for the species.

Pacific sleeper, salmon and other sharks Quantity	As estimated or *specified last* year for: 2014	 2015	As estimated or *recommended this* year for: 2015	 2016
Tier	6	6	6	6
OFL (t)	571	571	**571**	571
maxABC (t)	427	427	427	427
ABC (t)	427	427	**427**	427
Status	As determined *last* year for: 2012	 2013	As determined *this* year for: 2013	 2014
Overfishing		n/a		n/a

Summaries for Plan Team

Species	Year	Biomass[1]	OFL[2]	ABC[2]	TAC	Catch[3]
Shark Complex	2013	76,979	8,037	6,028	6,028	2,165
	2014	76,452	7,986	5,989	5,989	954
	2015	76,452	7,986	5,989		
	2016	76,452	7,986	5,989		

[1]This is spiny dogfish biomass only, because the biomass estimates for the remaining shark species in the complex are not used for ABC and OFL calculations. The biomass used for the spiny dogfish ABC and OFL calculations for 2014 - 2016 is the average of the 3 most recent trawl survey biomasses (2009, 2011, and 2013).
[2]ABC and OFL are the sum of the individual species recommendations, Tier 6 (avg catch 1997-2007) for Pacific sleeper shark, salmon shark and other/unidentified sharks and a modified Tier 6 (biomass * M) for spiny dogfish.
[3]Catch as of October 1, 2014.

BSAI shark bycatch.

For 2014 NOAA recommend the maximum allowable ABC of 454 t and an OFL of 605 t for the shark complex. Catch in 2013 was 116 t and 118 t in 2014 as of November 20, 2014. The stock complex was not subject to overfishing last year, and data do not exist to determine if the species in the complex are overfished.

ABC and OFL calculations and Tier 6 recommendations for 2014 - 2015. OFL = average shark catch from 1997 - 2007. ABC = OFL*0.75.

Quantity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year for: 2015	2016
Tier	6	6	6	6
OFL (t)	1,363	1,363	**605**	605
maxABC (t)	1,022	1,022	454	454
ABC (t)	1,022	1,022	**454**	454
Status	As determined *last* year for: 2012	2013	As determined *this* year for: 2013	2014
Overfishing	No	n/a	No	n/a

Summaries for Plan Team

Species	Year	Biomass[1]	OFL	ABC	TAC	Catch[2]
Shark Complex	2013		1,363	1,022	100	116
	2014		1,363	1,022	125	118
	2015		605	454		
	2016		605	454		

[1]The shark complex in the BSAI is a Tier 6 complex with no reliable estimates of biomass
[2]Catch as of November 20, 2014

Figure F13.3 BSAI Shark complex reference points [164]

Seabirds

While the fisheries achieved the lowest overall seabird bycatch since 1993, albatross bycatch increased in 2013 to 438 birds (249 black-foots and 189 Laysan), an increase of 25% compared to the previous 5 year average of 350. The 2013 numbers included the halibut fishery where previous years did not. However, the increase in albatross bycatch in the sablefish fisheries(>100) surpassed the new contribution from the halibut fishery (53 birds) while other fisheries (cod freezer longline) experienced reduced albatross bycatch numbers. Overall, Laysan albatross (Phoebastria immutabilis) bycatch increase by 40% and black-footed albatross (P. nigripes) increased by 70%. Although the black-footed albatross is not endangered (unlike its relative, the short-tailed albatross), it is considered a Bird of Conservation Concern by the U.S. Fish and Wildlife Service. This designation means that without additional conservation actions, these birds of concern are likely to become candidates for listing under the Endangered Species Act. Of special interest is the endangered short-tailed albatross (Phoebastria albatrus). Since 2003, bycatch estimates were above zero only in 2010 and 2011, when 2 birds and 1 bird were incidentally hooked respectively, resulting in estimated takes of 15 and 5 birds. This incidental take occurred in the Bering Sea area. No observed takes occurred in 2012 or 2013.[165]

[164] NPFMC. 2014. 2. Assessment of the Shark Complex in the Bearing Sea and Aleutian Islands. Accessed 2015. SAFE http://www.afsc.noaa.gov/REFM/Docs/2014/BSAIshark.pdf
[165] http://www.afsc.noaa.gov/REFM/Docs/2014/ecosystem.pdf

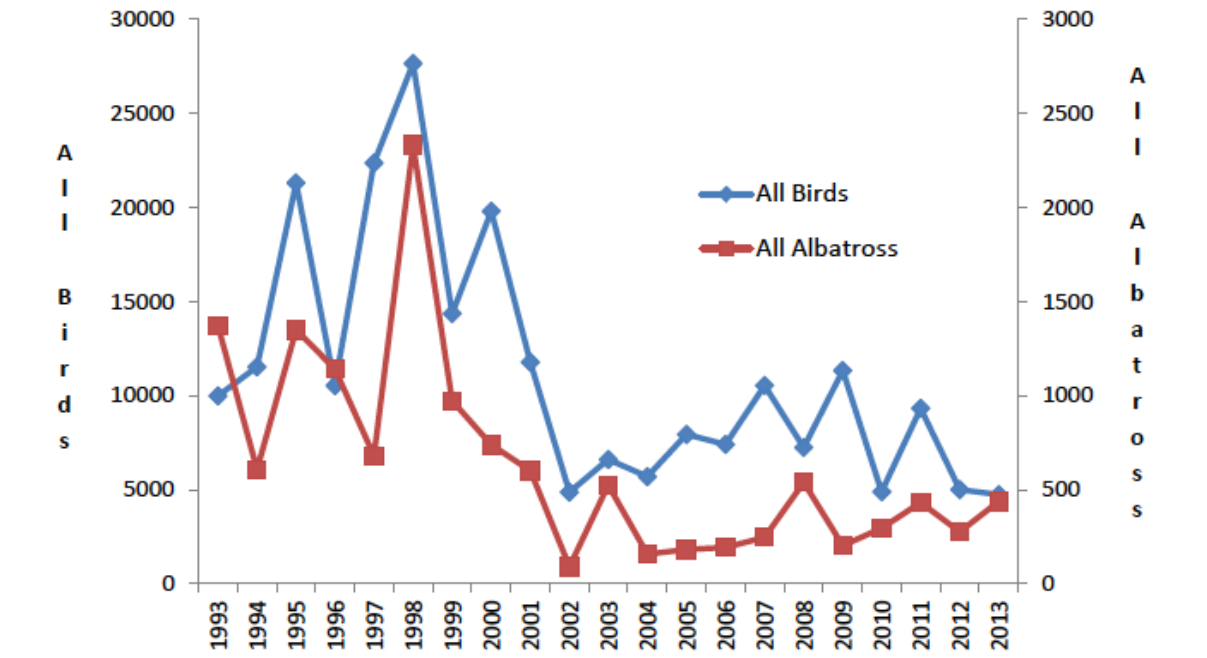


Figure F13.4 Seabird bycatch in Alaskan groundfish fisheries, all gear types combined, 1993 to 2013. Total estimated bird numbers are shown in the left-hand axis while estimated albatross numbers are shown in the right-hand axis.

Northern fulmar (Fulmaris glacialis) bycatch remained the highest proportion in the catch at 69%. Fulmar bycatch increased by 8% from the year before but remained 30% below the 5-year average. Fulmar bycatch has ranged between 45 to 76% of the total seabird bycatch since 2007. Average annual mortality for fulmars since 2007 has been 4,472. When compared to estimates of the total population size in Alaska of 1.4 million (Denlinger, 2006), this represents an annual 0.33% mortality due to fisheries. However, there is some concern that the mortality could be colony-specific possibly leading to local depletions (Hatch et al., 2010).

The demersal longline fishery in Alaska typically drives the overall estimated bycatch trends. Bycatch in the longline fishery showed a marked decline beginning in 2002 due to the deployment of streamer lines as bird deterrents. Since then, annual bycatch has remained below 10,000 birds, dropping as low as 4,007 in 2010. Numbers increased to 8,940 in 2011, the second highest in the streamer line era, but fell back to 4,571 in 2012 and further decreased to 4,246 in 2013. The increased numbers in 2011 were due to a doubling of the gull (Larus spp) numbers (1,088 to 2,157) and a 3-fold increase in fulmars, from 1,882 to 5,848. These species group numbers have decreased in 2012 as well, to 553 and 2,795 respectively. The addition of observers to many vessels in the Gulf of Alaska contributed important data for the understanding of seabird bycatch patterns and quantities. Note that in the year an entire fishery (halibut) was added the overall estimated seabird bycatch was the lowest ever, even while albatross bycatch increased, as was expected. The GOA typically accounts for few numbers of birds in most species groups except albatross.

Factors influencing observed trends:
The marked decline in overall numbers of birds caught after 2002 (Figure 98) reflects the increased use of seabird mitigation devices. A large portion of the freezer longline fleet adopted these measures in 2002, followed by regulation requiring them for the rest of the fleet beginning in February 2004. There are many factors that may influence annual variation in bycatch rates, including seabird distribution, population trends, prey supply, and fisheries activities. Work has continued on developing new and refining existing mitigation gear (Dietrich and Melvin, 2008).

The longline fleet has traditionally been responsible for about 91% of the overall seabird bycatch in Alaska, as determined from the data sources noted above. However, standard observer sampling methods on trawl vessels do not account for additional mortalities from net entanglements, cable strikes, and other sources. Thus, the trawl estimates are biased low (Fitzgerald et al., in prep). For example, the 2010 estimate of trawl-related seabird mortality is 823, while the additional observed mortalities (not included in this estimate and not expanded to the fleet) were 112. Observers now record the additional mortalities they see on trawl vessels and the AFSC Seabird Program is seeking funds to support an analyst to work on how these additional numbers can be folded into an overall estimate. The challenge to further reduce seabird bycatch is great given the rare nature of the event. For example, Dietrich and Fitzgerald (2010) found in an analysis of 35,270 longline sets from 2004 to 2007 that the most predominant species, northern fulmar, only occurred in 2.5 of all sets. Albatross, a focal species for conservation efforts, occurred in less than 0.1 of sets. However, given the vast size of the fishery, the total bycatch can add up to hundreds of albatross or thousands of fulmars (Table F13.8).

Table F13.8. Total estimated seabird bycatch in Alaskan groundfish fisheries, all gear types and Fishery Management Plan areas combined, 2007 through 2013. Note that these numbers represent extrapolations from observed bycatch, not direct observations. See text for estimation methods.[166]

Species/Species Group	2007	2008	2009	2010	2011	2012	2013
Unidentified Albatross	17	0	0	0	0	0	0
Short-tailed Albatross	0	0	0	15	5	0	0
Black-footed Albatross	200	314	56	48	221	141	249
Laysan Albatross	17	226	148	233	206	135	189
Northern Fulmar	4700	3334	8199	2452	6214	3022	3268
Shearwaters	3586	1224	620	653	194	514	191
Storm Petrels	1	44	0	0	0	0	0
Gull	1345	1551	1335	1145	2158	890	556
Kittiwake	10	0	16	0	6	5	3
Murre	6	6	13	102	14	6	3
Puffin	0	0	0	5	0	0	0
Auklets	0	3	0	0	0	7	4
Other Alcid	0	0	105	0	0	0	0
Other	0	0	136	0	0	0	0
Unidentified	514	541	696	240	306	285	267
Grand Total	10397	7243	11323	4894	9324	5005	4731

Implications:

There seems to be a generally decreasing trend in seabird bycatch since the new estimation procedures began in 2007, indicating no immediate management concern other than continuing the goal of decreased seabird bycatch. It is difficult to determine how seabird bycatch numbers and trends are linked to changes in ecosystem components because seabird mitigation gear is used in the longline fleet. There does appear to be a link between poor ocean conditions and the peak

[166] http://www.afsc.noaa.gov/REFM/Docs/2014/ecosystem.pdf

bycatch years, on a species-group basis. Fishermen have noted in some years that the birds appear "starved" and attack baited longline gear more aggressively. In 2008 general seabird bycatch in Alaska was at relatively low levels (driven by lower fulmar and gull bycatch) but albatross numbers were the highest at any time between 2002 and 2013. This could indicate poor ocean conditions in the North Pacific as albatross traveled from the Hawaiian Islands to Alaska. Broad changes in overall seabird bycatch, up to 5,000 birds per year, occurred between 2007 and 2013. This probably indicates changes in food availability rather than drastic changes in how well the fleet employs mitigation gear. A focused investigation of this aspect of seabird bycatch is needed and could inform management of poor ocean conditions if seabird bycatch rates (reported in real time) were substantially higher than normal.[167]

Interactions with whales

Sperm whales are likely a major predator of adult sablefish. Fish are an important part of sperm whale diet in some parts of the world, including the northeastern Pacific Ocean (Kawakami 1980). Fish have appeared in the diets of sperm whales in the eastern AI and GOA. Although fish species were not identified in sperm whale diets in Alaska, sablefish were found in 8.3% of sperm whale stomachs off of California (Kawakami 1980).[168]

Killer whale depredation and mortality

Killer whales impact sablefish catch rates in the BS, AI and WGOA and these sets are excluded from catch rate analyses. Since 2009, there has been an increase in killer whale depredation in the WGOA (average 6% from 2010-2013); however, this is only 7-18 sets per year. In the AI and BS, killer whale depredation has been variable, ranging from 0-12 sets per year in each area. Sperm whale depredation occurs in the CGOA, EY/SE, WY, and sometimes in the WGOA. The percent of sets in each area depredated by sperm whales varies greatly and determining if sperm whales are depredating can be subjective because whales do not take the great majority of the catch, like killer whales do. Therefore, measures of depredation in the fishery may not be accurate.[169]

4. Pollution – MARPOL

MARPOL 73/78 (the "International Convention for the Prevention of Pollution From Ships") is one of the most important treaties regulating pollution from ships. Six Annexes of the Convention cover the various sources of pollution from ships and provide an overarching framework for international objectives. In the U.S., the Convention is implemented through the Act to Prevent Pollution from Ships (APPS). Under the provisions of the Convention, the United States can take direct enforcement action under U.S. laws against foreign-flagged ships when pollution discharge incidents occur within U.S. jurisdiction. When incidents occur outside U.S. jurisdiction or jurisdiction cannot be determined, the United States refers cases to flag states, in accordance with MARPOL. These procedures require substantial coordination between the Coast Guard, the State Department, and other flag states, and the response rate from flag states has been poor. Different regulations apply to vessels, depending on the individual state.[170] [171]

[167] Ibid.
[168] Kawakami, T. 1980. A review of sperm whale food. Sci. Rep. Whales Res. Inst. 32: 199-218.
[169] http://www.afsc.noaa.gov/REFM/Docs/2014/GOAsablefish.pdf
[170] Act to Prevent Pollution from Ships, 33 U.S.C. §§ 1901–1915. https://www.law.cornell.edu/uscode/text/33/1901
[171] U.S. Government Accountability Office, Washington, D.C. (2000). "Progress Made to Reduce Marine Pollution by Cruise Ships, but Important Issues Remain." Report to Congressional Requesters. Report No. RCED-00-48. http://www.gao.gov/assets/230/228813.pdf

5. Management responses to likely serious impacts on ecosystem

Many trawl closures have been implemented to protect benthic habitat or reduce bycatch of prohibited species (i.e., salmon, crab, herring, and halibut) (Figure 13.16). Some of the trawl closures are in effect year-round while others are seasonal. In general, year-round trawl closures have been implemented to protect vulnerable benthic habitat. Seasonal closures are used to reduce bycatch by closing areas where and when bycatch rates had historically been high.

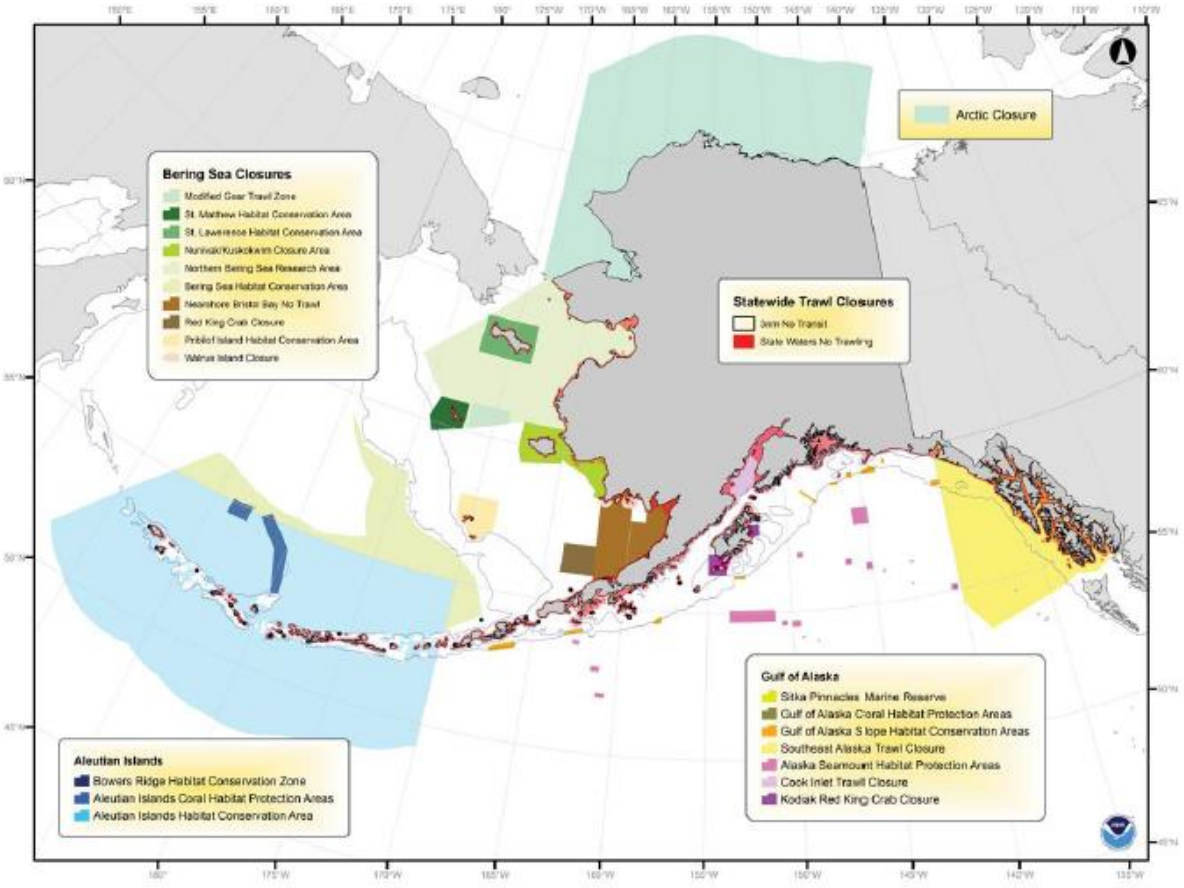


Figure 13.5. Year round groundfish closures in the U. S Exclusive Economic Zone (EEZ) off Alaska, excluding most SSL closures. [172]

6. Regulations/measures to minimize impacts

Regulations are in place to address waste, discard, bycatch, and endangered species interactions in the sablefish fisheries. NMFS, and ADFG promulgate these regulations through the NPFMC, and the Alaska Board of Fisheries. Since January 2013, the sablefish fleet is partially covered by the newly restructured North Pacific Groundfish Observer Program.

Bycatch of seabirds has been addressed by specific regulations put in place to reduce the incidental mortality of the short-tailed albatross, a listed species under the Endangered Species Act (ESA), and other seabird species in 1998, then revised in 2008. These measures now include the use of streamer (tory) lines, night setting, lineshooters and lining tubes, have been shown to reduce seabird interactions when setting or retrieving gear.

[172] NPFMC. 2014. Ecosystem Consideration Report. Accessed 2015. http://www.afsc.noaa.gov/REFM/Docs/2014/ecosystem.pdf

General spawning areas have been mapped in Alaska. The NPFMC has established Marine Protected Areas that benefit juvenile fish and adult spawners. Additional trawl closures for areas in the Bering Sea, Aleutian Islands and Gulf of Alaska provide a significant degree of refuge for juvenile sablefish.

7. Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) mandates NOAA to identify habitats essential for managed species and conserve habitats from adverse effects on those habitats (NMFS 2010). These habitats are termed "Essential Fish Habitat" or EFH, and are defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (NMFS 2010).[173]

8. Research on environment and social impacts of fishing gear

Sablefish data gaps and research priorities

There is little information on early life history of sablefish and recruitment processes. A better understanding of juvenile distribution, habitat utilization, and species interactions would improve understanding of the processes that determine the productivity of the stock. Better estimation of recruitment and year class strength would improve assessment and management of the sablefish population.

Future sablefish research is going to focus on several directions:

1) Refine survey abundance index model for inclusion in the 2014 assessment model that accounts for whale depredation and potentially includes gully abundance data and other covariates.

2) Refine fishery abundance index to utilize a core fleet, and identify covariates that affect catch rates.

3) Improve knowledge of sperm whale and killer whale depredation in the fishery and begin to quantify depredation effects on fishery catch rates.

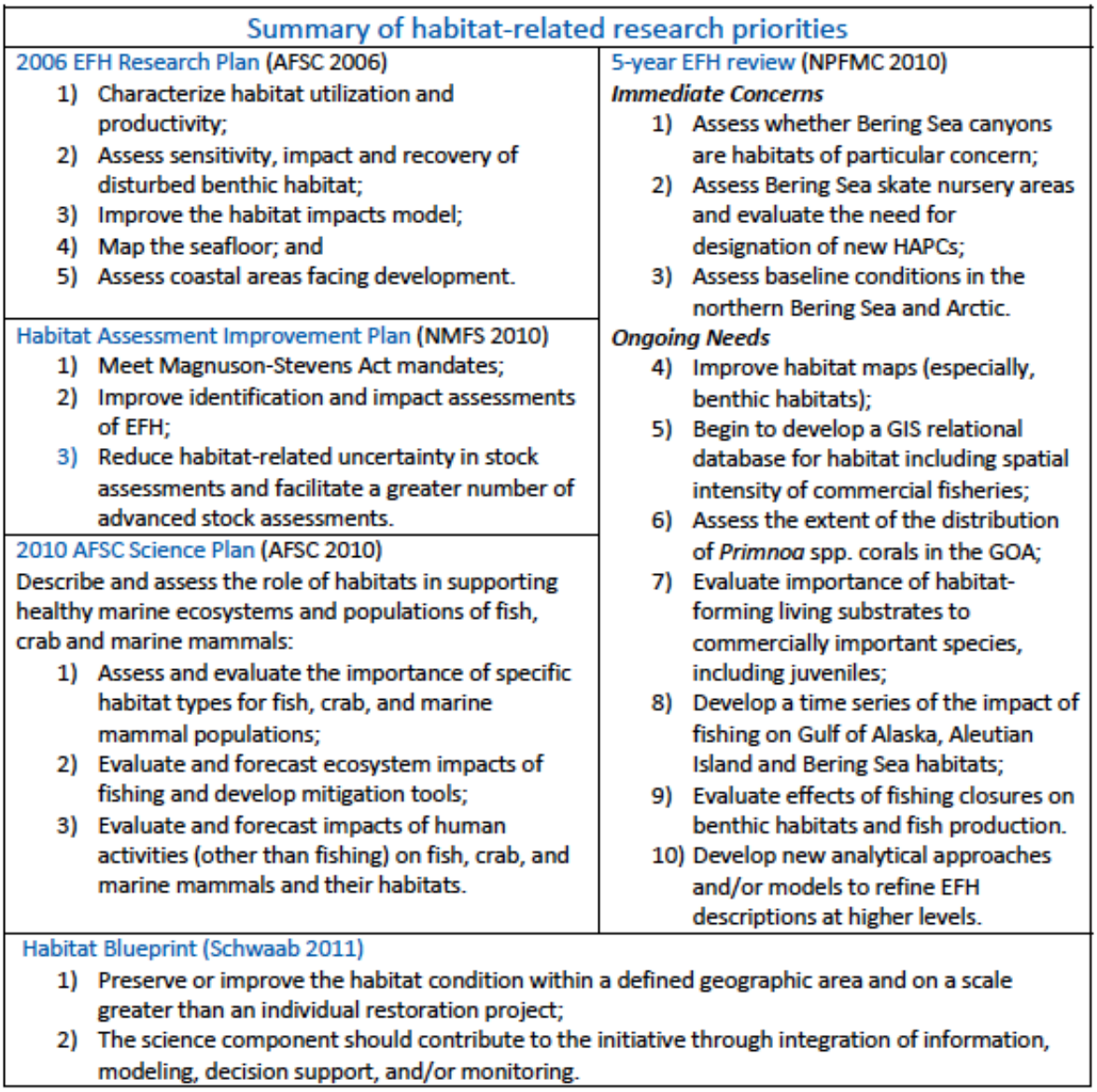
4) Continue to explore the use of environmental data to aid in determining recruitment.

5) An integrated GOA Ecosystem project funded by the North Pacific Research Board is underway and is looking at recruitment processes of major groundfish including sablefish. The hope is to work closely with this project to help understand sablefish recruitment dynamics.

6) The SAFE Authors hope to develop a spatially explicit research assessment model that includes movement, which will help in examining smaller-scale population dynamics while retaining a single stock hypothesis Alaska-wide sablefish model. This is to include management strategy evaluations of apportionment strategies. [174]

[173] NMFS Essential Fish Habitat Research Plan http://www.afsc.noaa.gov/HEPR/docs/Sigler_et_al_2012_Alaska_Essential_Fish_Habitat_Research_Plan.pdf

[174] http://www.afsc.noaa.gov/REFM/Docs/2014/GOAsablefish.pdf



Summary of habitat-related research priorities

2006 EFH Research Plan (AFSC 2006)

1) Characterize habitat utilization and productivity;
2) Assess sensitivity, impact and recovery of disturbed benthic habitat;
3) Improve the habitat impacts model;
4) Map the seafloor; and
5) Assess coastal areas facing development.

Habitat Assessment Improvement Plan (NMFS 2010)

1) Meet Magnuson-Stevens Act mandates;
2) Improve identification and impact assessments of EFH;
3) Reduce habitat-related uncertainty in stock assessments and facilitate a greater number of advanced stock assessments.

2010 AFSC Science Plan (AFSC 2010)

Describe and assess the role of habitats in supporting healthy marine ecosystems and populations of fish, crab and marine mammals:

1) Assess and evaluate the importance of specific habitat types for fish, crab, and marine mammal populations;
2) Evaluate and forecast ecosystem impacts of fishing and develop mitigation tools;
3) Evaluate and forecast impacts of human activities (other than fishing) on fish, crab, and marine mammals and their habitats.

5-year EFH review (NPFMC 2010)

Immediate Concerns

1) Assess whether Bering Sea canyons are habitats of particular concern;
2) Assess Bering Sea skate nursery areas and evaluate the need for designation of new HAPCs;
3) Assess baseline conditions in the northern Bering Sea and Arctic.

Ongoing Needs

4) Improve habitat maps (especially, benthic habitats);
5) Begin to develop a GIS relational database for habitat including spatial intensity of commercial fisheries;
6) Assess the extent of the distribution of *Primnoa* spp. corals in the GOA;
7) Evaluate importance of habitat-forming living substrates to commercially important species, including juveniles;
8) Develop a time series of the impact of fishing on Gulf of Alaska, Aleutian Island and Bering Sea habitats;
9) Evaluate effects of fishing closures on benthic habitats and fish production.
10) Develop new analytical approaches and/or models to refine EFH descriptions at higher levels.

Habitat Blueprint (Schwaab 2011)

1) Preserve or improve the habitat condition within a defined geographic area and on a scale greater than an individual restoration project;
2) The science component should contribute to the initiative through integration of information, modeling, decision support, and/or monitoring.

Figure F13. 17 Summary of habitat related research priorities [175]

Clause 14 "where fisheries enhancement is utilized, environmental assessment and monitoring shall consider genetic diversity and ecosystem integrity" is not relevant to this fishery.

[175] AFSC PROCESSED REPORT 2012-06 Alaska Essential Fish Habitat Research Plan
http://www.afsc.noaa.gov/HEPR/docs/Sigler_et_al_2012_Alaska_Essential_Fish_Habitat_Research_Plan.pdf

8. Performance specific to agreed corrective action plans

Not Applicable. This is the 4th FAO RFM Alaska Sablefish surveillance assessment report. Non-conformances were not issued during the full assessment nor the 1st ,2nd or 3rd surveillance assessments. However, a number of issues were identified for review during surveillance to identify whether management actions were being taken to improve issues relating to estimation of bycatch in the sablefish fleet and the restructuring of the observer program. The developments have been positive and proceeded as planned. Details of these points are available under Fundamental Clause 8 and 13.

9. Unclosed, new non conformances and new corrective action plans

Not applicable, no new non conformances have been issued.

10. Future Surveillance Actions

Not applicable.

11. Client signed acceptance of the action plan

Not applicable.

12. Recommendation and Determination

Following this 4th surveillance assessment, finalized in October 2015, the assessment team recommends that continued Certification under the Alaska FAO-Based Responsible Fisheries Management Certification Program is maintained for the management system of the applicant fishery, the US Alaska sablefish federal and state commercial fisheries, under federal (National Marine Fisheries Service/North Pacific Fishery Management Council) and state (Alaska Department of Fish and Game/Board Of Fisheries) management, fished with benthic longline, pot and trawl gear (within Alaska's 200 nm EEZ).

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Appendix 1

Assessment Team Details

Based on the technical expertise required to carry out the above fishery assessment, Global Trust Certification Ltd., is pleased to confirm the 4th Surveillance assessment team members for the fishery as follows:

Dr. Ivan Mateo, Lead Assessor

Dr. Ivan Mateo has over 15 years' experience working with natural resources population dynamic modeling. His specialization is in fish and crustacean population dynamics, stock assessment, evaluation of management strategies for exploited populations, bioenergetics, ecosystem-based assessment, and ecological statistical analysis. Dr. Mateo received a Ph.D. in Environmental Sciences with Fisheries specialization from the University of Rhode Island. He has studied population dynamics of economically important species as well as candidate species for endangered species listing from many different regions of the world such as the Caribbean, the Northeast US Coast, Gulf of California and Alaska. He has done research with NMFS Northeast Fisheries Science Center Ecosystem Based Fishery Management on bioenergetic modeling for Atlantic cod He also has been working as environmental consultant in the Caribbean doing field work and looking at the effects of industrialization on essential fish habitats and for the Environmental Defense Fund developing population dynamics models for data poor stocks in the Gulf of California. Recently Dr. Mateo worked as National Research Council postdoc research associate at the NOAA National Marine Fisheries Services Ted Stevens Marine Research Institute on population dynamic modeling of Alaska sablefish.

William Brodie, Assessor

Bill Brodie is an independent fisheries consultant with previously, a 36-year career with Science Branch of Fisheries and Oceans Canada (DFO, Newfoundland and Labrador Region). He has a BSc in Biology from Memorial University of Newfoundland and Labrador. For the last twelve years of service he worked as Senior Science Coordinator/Advisor on Northwest Atlantic Fisheries Organization (NAFO) issues, serving as chair of the Scientific Council of NAFO and chairing 3 standing committees. As a senior stock assessment biologist, he led assessments and surveys for several flatfish species and stocks, including American plaice, Greenland halibut, yellowtail and witch flounders. These include the largest stocks of flatfish in the NW Atlantic. He also participated in ICES assessments of flatfish, cod, and shrimp stocks in the NE Atlantic and North Sea. Bill has participated in over 30 scientific research vessel surveys on a variety of Canadian and international ships. He has also worked with fishery managers and the fishing industry on developing stock rebuilding plans under a Precautionary Approach. Bill has previously served as an assessor on Alaska Responsible Fisheries Management certification surveillance audits for Pacific cod and Pacific halibut.

Deirdre Hoare, Assessor

Deirdre Hoare has a BSc in Marine Science and a MSc in Marine Zoology from the National University of Ireland, Galway and a post graduate diploma in Statistics from Trinity College Dublin. Deirdre has worked directly in fisheries stock assessment as an observer on international projects in NAFO and Ireland. For 5 years she worked as a Fisheries Assessment Analyst and as a Scientific and Technical Officer for the Marine Institute in Ireland. This work involved fisheries research and stock assessment for ICES working groups. The work also involved coordination and management of a Fisher Self sampling program in the Irish Sea, with particular emphasis on spatial and temporal discard measurement tools. Currently Deirdre is working as an independent Fisheries Consultant. Her work currently involves evaluation and verification of fisheries management and sustainability against international standards. Deidre has previously served as an assessor on FAO Based Responsible Fisheries Management Certifications in Iceland and Alaska. She also performs fish stock assessments, data evaluations and outlines the limitations.